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Programmatic environmental assessment for containment/ eradication of noxious plants tiered to the

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nmental Assessment

Noxious Weed Control Program FEIS, 1985)

Containment/Eradication of Selected NOXIOUS PLANTS

In BLM Lewistown District

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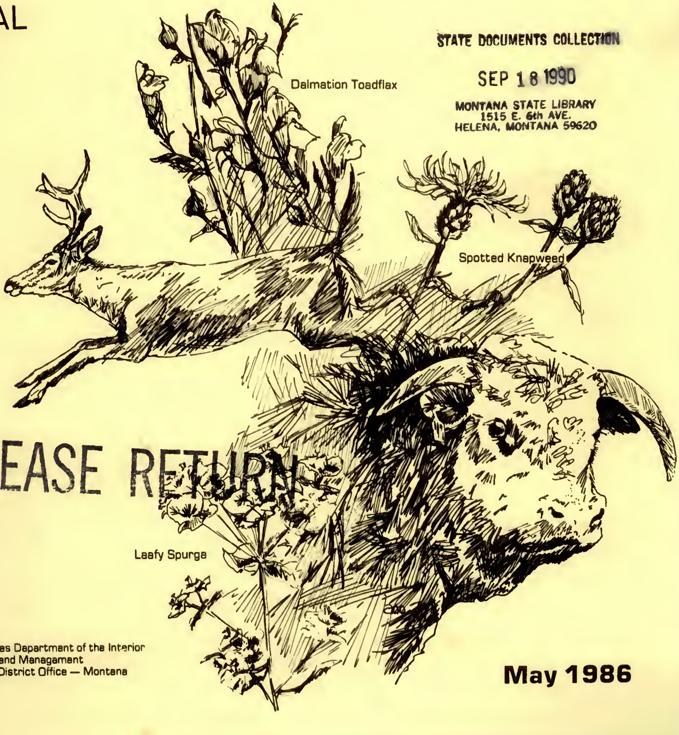

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PROGRAMMATIC ENVIRONMENTAL ASSESSMENT
FOR
CONTAINMENT/ERADICATION OF NOXIOUS PLANTS
TIERED TO THE NORTHWEST AREA NOXIOUS
WEEDS CONTROL PROGRAM FEIS, 1985

LEWISTOWN DISTRICT - MONTANA

BUREAU OF LAND MANAGEMENT

MAY 1986

DECISION RECORD

FOR

The Programmatic Environmental Assessment for Containment/Eradication of Noxious Plants in the Lewistown District, Montana,

Bureau of Land Management, May 1986

It is my decision to adopt the preferred alternative for containment/eradication of noxious plants (weeds) in the Lewistown District.

The preferred alternative is: The application of all approved methods (burning, mechanical, herbicides, and biological) for noxious plant containment/eradication (control).

The herbicides analyzed in the preferred alternative and selected for use singularly or in combination are 2,4-D, dicamba and picloram.

The major management rationale for the preferred alternative selection is that the Federal, state, and county governments must meet their legal obligations to control noxious plants (Federal Land Management Policy and Management Act, Carlson-Foley Act 90-583 and Public Rangelands Improvement Act).

This alternative would reduce the present and future economic losses to the general public and to ranchers caused by lower range and forest land productivity for livestock and wildlife due to noxious plant competition.

The Bureau of Land Management, Lewistown District has analyzed a proposal for noxious plant control on public lands consistent with noxious plant control program requirements established by the Montana Noxious Weed Control Program Record of Decision (ROD) April 7, 1986. Significant portions of this environmental assessment were derived from or supported by the United States Department of Interior, Bureau of Land Management's Northwest Area Noxious Weed Control Program Final Environmental Impact Statement, December 1985.

The attached EA and this Decision Record are tiered to the aforementioned Final Environmental Impact Statement and ROD. Each of these documents may be reviewed at the Lewistown District Office. There are no other related environmental documents.

The proposal, associated design features and potential mitigation measures are described in the attached Environmental Assessment No. MT-060-6-8 which was made available to the public on June 9, 1986.

FINDING OF NO SIGNIFICANT IMPACT

Based on the facts and circumstances discussed herein, it is determined that there will be no significant impact on the quality of the human environment, therefore, an environmental impact statement will not be prepared.

This decision will be implemented immediately after the decision date.

5/13/86
Date

Glenn W Freeman
Glenn W. Freeman, District Manager
Lewistown District Office
Lewistown, Montana 59457

ABSTRACT

The objective of the noxious plant control program is to reduce or eliminate noxious plants from public land administered by the BLM. This Environmental Assessment analyzes two alternatives concerning the containment/eradication of selected noxious plants in the Lewistown BLM District. 1/

Leafy spurge (*Euphorbia esula*), spotted knapweed (*Centaurea maculosa*), Russian knapweed (*Centaurea repens*), diffuse knapweed (*Centaurea diffusa*), Canada thistle (*Cirsium arvense*), white top (*Cardaria draba*), whitepoint locoweed (*Oxytropis sericea*), field bindweed (*Convolvulus arvensis*), musk thistle (*Carduus nutans*) and Dalmation toadflax (*Linaria dalmatica*) plants are the primary target species. Other plants may be designated to this list by the county commissioners, through their respective county weed boards, of any county within the Lewistown BLM District.

One or more or a combination of the herbicides 2,4-D, dicamba, and picloram are proposed for use. 2/ Biological, mechanical, and fire management methods are being developed and refined. As these opportunities are perfected, they may be used. 3/ This effort is a cooperative response to Public Law 90-583 (Carlson-Foley Act) and to intergovernmental and private efforts to contain/eradicate these plants in Montana.

For additional information contact: Glenn Freeman, Lewistown District Manager, Bureau of Land Management, Airport Road, Lewistown, Montana 59457, (406) 538-7461.

1/ Two additional alternatives (No Aerial Herbicide Application and No Herbicide Use) were analyzed in the Northwest Area Noxious Weed Control Program FEIS, 1985.

2/ The Northwest FEIS also analyzed the herbicide glyphosate.

3/ These non-chemical methods were analyzed in the Northwest FEIS.

SUMMARY

The objective of the noxious plant control program is to reduce or eliminate noxious plants from public land administered by the BLM (biological and fire management methods are being developed and will be considered when refined). 1/ This Environmental Assessment analyzes two alternatives concerning the containment/ eradication of selected noxious plants through chemical methods in the Lewistown BLM District. 2/

The BLM is responsible for implementing a noxious plant control program on public land and will do so through cooperative agreements with county weed control districts. The Montana Department of Agriculture is responsible for coordinating noxious plant control activities on Federal, state and private land.

Additional plants may be designated to the list given in the preceding Abstract by the county commissioners, through their respective county weed boards, of any county within the Lewistown BLM District. One or more or a combination of the herbicides 2,4-D, dicamba, and picloram are proposed for use. 3/

This effort is a cooperative response to Public Law 90-583 (Carlson-Foley Act) and to intergovernmental and private efforts to contain/eradicate noxious plants in Montana.

In cooperation with other Federal and state agencies and county weed boards, the BLM must determine how a containment/eradication program will be initiated. The BLM must determine which herbicide(s) will be applied, application rates, restrictions, application dates and human and non-human health and safety requirements.

Biological control (e.g. insects, livestock), mechanical treatments (mowing, grubbing), and prescription burning are three alternatives which were considered, but not analyzed. These methods are not sufficiently refined nor economically or logistically possible at this time. As these opportunities are perfected, they may be used. However, one or more of these methods may be used singularly or in combination with herbicides.

1/ These non-chemical methods were analyzed in the Northwest Area Noxious Weed Control Program FEIS, 1985.

2/ Two additional alternatives (No Aerial Herbicide Application and No Herbicide Use) were analyzed in the Northwest FEIS.

3/ The Northwest FEIS also analyzed the herbicide glyphosate.

Two alternatives are analyzed in this assessment, the preferred alternative and a no action alternative. The preferred alternative is to apply 2,4-D, dicamba or picloram singularly or a combination of these herbicides to areas infested by target noxious plants. The potential negative impacts of this alternative could include water contamination, damage to fishery populations, wildlife populations and habitat, degradation or selective loss of vegetation ground cover, and human and non-human health problems.

No application of herbicide control (the No Action Alternative) is also analyzed in this proposal. This alternative was not chosen as the preferred alternative.

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Appendix A1

I. INTRODUCTION

A. Purpose of and Need for Action

The Lewistown District proposed implementing a noxious plant containment/eradication program consistent with the Montana Noxious Control Record of Decision dated February 29, 1986. This decision meets the Purpose and Need set forth in the Northwest Area Noxious Weed Control Program Final Environmental Impact Statement (FEIS) of December, 1985. The statutes, policy and planning criteria for that decision are set forth in the Final EIS and Record of Decision (ROD). Copies of the FEIS are available at the Lewistown Bureau of Land Management (BLM) District Office and at its area offices at Glasgow, Malta, Havre, Great Falls, and Lewistown.

Management treatments and project design features relating to noxious plant control activities are presented in the FEIS pages 7 to 11 and Appendix I (including district map(s) showing infested areas). All mitigation measures adopted in the Records of Decision are incorporated as additional project design features.

This Environmental Assessment (EA) analyzes the containment/eradication of selected noxious plants through chemical, biological, mechanical and fire management methods in the Lewistown BLM District (see Figure 1.1).

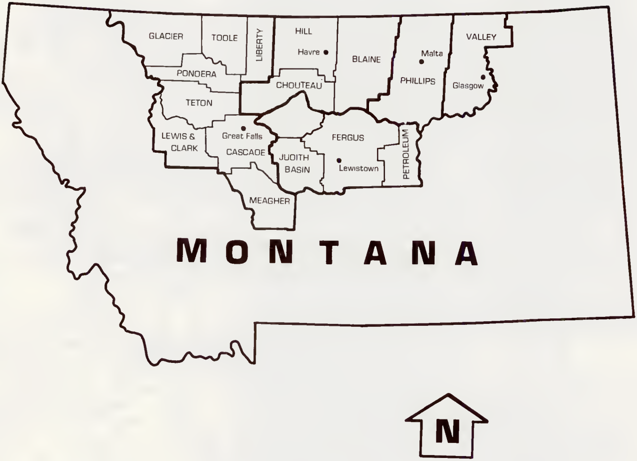
The BLM is responsible for implementing a noxious plant control program on public land and will do so through cooperative agreements with county weed control districts. The Montana Department of Agriculture is responsible for coordinating noxious plant control activities on Federal, state and private land.

Leafy spurge (Euphorbia esula), spotted knapweed (Centaurea maculosa), Russian knapweed (Centaurea repens), diffuse knapweed (Centaurea diffusa), Canada thistle (Cirsium arvense), white top (Cardaria draba), whitepoint locoweed (Oxytropis sericea), field bindweed (Convolvulus arvensis), musk thistle (Carduus nutans) and Dalmation toadflax (Linaria dalmatica) plants are the target species. Other plants may be designated to this list by the county commissioners, through their respective county weed boards, of any county within the Lewistown BLM District.

Management criteria for detection and immediate action to eradicate or contain these additional noxious plants is necessary in all counties as they invade. 1/

1/ This list is derived from the County Noxious Weed Management Act, Montana Department of Agriculture, 1985, Section 7-22-2101, Category 1 and 2.

FIGURE 1.1 LOCATION MAP OF LEWISTOWN DISTRICT BUREAU OF LAND MANAGEMENT, MONTANA



(a) Dyers Woad (Isatis tinctoria)
(b) Yellow Starthistle (Centaurea solstitialis)
(c) Common Crupina (Crupina vulgaris)
(d) Tansy Ragwort (Senecio jacobaea)
(e) Rush Skeletonweed (Chondrilla juncea)
(f) St. Johnswort (Hypericum perforatum).

The main authority sources that direct the BLM noxious plant management program are the County Noxious Weed Management Act, Oct. 1985, the Federal Land Policy and Management Act of 1976 (FLPMA), the Public Rangelands Improvement Act of 1978 (PRIA) and Public Law 90-583 (Carlson-Foley Act of 1968 - see Appendix 1.1). According to Public Law 90-583, the BLM must provide for the control of noxious plants on Federal land under BLM administration.

The BLM options are controlled by the funds available, the location of noxious plants, and decisions for eradication or containment made by resource area personnel. Public Law (90-583) states that the heads of Federal departments or agencies are authorized and directed to permit the Commissioner of Agriculture, or other proper agency head of any state in which there is in effect a program for the control of noxious plants, to enter upon any lands under their control or jurisdiction and destroy noxious plants growing on such land if:

(1) such entry is in accordance with a program submitted to and approved by such department or agency (provided that no entry shall occur when the head of such Federal department or agency, or his designee, shall have certified that entry is inconsistent with national security);

(2) the means by which noxious plants are destroyed are acceptable to the head of such department or agency; and

(3) the same procedure required by the state program with respect to privately owned land has been followed.

This Programmatic Environmental Assessment applies throughout the Lewistown District. Site specific noxious plant control projects will be analyzed and documented individually.

This Programmatic Environmental Assessment sets the guidelines and background information needed for the Lewistown BLM District noxious plant management program. This EA is subordinate to and tiered from the Northwest Area Noxious Weed Control Program EIS, 1985. The BLM will develop a project specific Pesticide Use Proposal, Narrative Justification, and an Environmental Assessment Clearance Record to evaluate the method and specifications needed on each project area. If this Programmatic Environmental Assessment does not adequately address the onsite circumstances, issues, solutions and stipulations, an exception analysis will be prepared.

B. Scoping

Specific internal and public concerns are identified in this EA. These concerns were identified after consultation with county agents, county weed boards and a number of ranchers with interests in noxious plant control. These concerns include: water quality degradation, agricultural products (crops and livestock) damages, riparian wildlife habitats, direct and indirect wildlife degradation and loss, the effects of no weed control on public and private resources, and human health and safety.

C. Descriptions of the Principal Noxious Plants

1. Leafy spurge is a very troublesome noxious plant in Montana. It is a competitive, aggressive creeping perennial which is difficult and expensive to control. It has deep, tenacious root systems, the capacity to sprout from root segments and has underground buds and seeds which can remain viable for at least 8 years. It grows any place from the best agriculture land to rocky slopes and hillsides of low productive rangeland sites. Infestations range from solid stands where all other vegetation is virtually eliminated to isolated patches which serve as a seed source for infestation of additional areas.

2. Russian knapweed is a long-lived perennial, rhizomatous plant that spreads by seeds and underground creeping rootstocks. The roots are vigorous, spreading, extensive and characteristically black in color. The flowers are usually pink to purple. It is widely distributed throughout Montana and is rapidly spreading in the state. Once established it is very competitive and very difficult to contain. The seeds are difficult to remove from alfalfa and sweetclover seed and such unclean seed has been responsible for many of the present infestations.

3. Spotted knapweed is a biannual or short-lived simple perennial plant which reproduces only by seed, yet is able to invade a wide variety of habitats. Flowers are usually purple, and the outer row of bracts under the head have black, fringed tips. It produces seed even with below normal precipitation and then rapidly invades areas where other vegetation is weakened by drought. The late fall and early spring growth pattern gives it a competitive advantage over most plants. In addition, this weed produces a toxin that inhibits the growth of many plants, often resulting in stands of almost pure spotted knapweed. Spotted knapweed is considered a threat to much of Montana's rangeland and wildlife habitats. It spreads even more rapidly than Russian knapweed and leafy spurge.

4. Diffuse knapweed is very similar to spotted knapweed, however, the plant lacks the dark spots on the bracts. The flower heads are spiny to the touch and the flowers are usually white.

5. Canada thistle is an introduced, deep-rooted, creeping perennial forb. This spiny plant reproduces by seeds and creeping rootstocks that spread laterally 12 to 15 feet in a single year. New shoots form on these roots each spring. Its grooved stems are 2 to 5 feet tall, and branch near the top. They are slightly hairy when young but become covered with hair as the plant matures. Most of the leaves are oblong, irregular and have deeply-cut, spiny-toothed edges. Flowers are 3/4-inch or less in diameter and are usually purple to rose in color. Sometimes, however, Canada thistle plants have white flowers.

   This undesirable plant produces small 3/16-inch long, smooth light-brown seeds which are tipped by a cupped, conical point. These seeds are easily carried and spread by wind because of a tuft of hair loosely attached to the seed tip.

   Where range is overused, cattle may graze on Canada thistle. Because the plant is capable of accumulating large quantities of nitrates, it can cause abortions.

6. Musk thistle is a biennial reproducing by seed. It is found in roadsides, fencelines, pastures, haylands and meadows. The stems are erect, branched above, hairy, spiny leaves give stem a winged appearance; 3 to 5 feet tall. The plant has a heavy taproot. The flowers are deep rose to purple in color.

7. Dalmation toadflax is a creeping perennial reproducing by seeds and heavy horizontal or creeping rootstocks. It is found along roadsides and near dwellings spreading to valley bottoms and terraces. The stems are erect, coarse, smooth, arising from a woody, branching base 1 to 4 feet tall. The flowers are deep yellow with an orange throat located in the axils of upper leaves and bracts. One plant of dalmation toadflax may produce 250,000 seeds in a season. It spreads rapidly in rocky and rough terrain where a control program is difficult to conduct. Dalmation toadflax is very unpalatable to livestock.

8. White top is a creeping perennial mustard reproducing by seeds and horizontal creeping roots. It is found along roadsides, waste places and on rangeland. The stems are erect or spreading; stout, slender, or branched stems, slightly to very hairy and 4 to 24 inches tall. The flowers are white, little more than 1/8-inch wide, each on a stalk about 1/2-inch long. Whitetop is also referred to as hoary cress.

9. Whitepoint locoweed is a simple perennial, reproducing only by seeds. All common species of locoweed are poisonous to livestock and perhaps cause greater livestock losses than any other poisonous weed in Montana. All parts of the locoweed is poisonous at all stages of growth and throughout the entire year, even after it has matured and dried.

10. Field bindweed is a creeping perennial. It reproduces two ways. First, seeds are spread by hay, machinery and vehicles and with other seeds used in plantings. The seeds can remain viable in the soil for years before germinating. Second, the plant has a network of lateral roots which form vertical shoots. The vertical roots go 8 or more feet deep. This helps the plant survive dry weather. A single plant may give rise to 25 shoots in one growing season, spreading out to cover an area 10 feet in diameter. The vines of this weed are from 2 to 7 feet long. The flowers are funnel shaped; white to light pink in color with narrow bracts or stem below each flower. Field bindweed is also referred to as morning glory or creeping Jenny.

II. DESCRIPTION OF ALTERNATIVES

A. Alternatives Considered but not Analyzed

1. No Aerial Herbicide Application

2. No Use of Herbicides

These alternatives were analyzed in the Bureau of Land Management (BLM) Northwest Area Noxious Weed Control Program EIS, 1985, pages 6 and 7 and will not be analyzed in this environmental assessment (EA).

B. Alternatives Considered

1. No Action

The No Action Alternative allows no control efforts to stop the growth and further spread of noxious plants (other than good range management practices). In addition, this alternative was analyzed in the Northwest Area Noxious Weed Control Program Final Environmental Impact Statement (FEIS), 1985.

2. The Preferred Alternative (Application of Herbicides: 2,4-D (Amine and Esters); dicamba; and picloram) 1/

This alternative endorses the application of selected herbicides singularly or in combination on target noxious plants at specific locations. It is an integrated methodology including herbicides, manual, biological and mechanical (including burning) processes. The analysis of this alternative is exclusive to herbicides and references the Northwest FEIS.

This alternative would reduce the present and future economic losses to the general public and to ranchers caused by lower range and forest land productivity for livestock and some wildlife due to noxious plant competition. It would also bring BLM into compliance with state and Federal noxious plant laws.

The most effective method available, at the present time, to contain noxious plant infestations is the use of herbicides; therefore, the proper use of select herbicides will be the major part of this document. Appendix 2.1 discusses the alternative methods of applying herbicides.

1/ Refer to the Northwest FEIS for analysis and discussion relative to glyphosate.

Procedures to Apply the Preferred Alternative

The BLM, in cooperation with various state and Federal agencies and selected cooperators, must determine if chemical/biological/fire/mechanical methods would be used to control/eradicate noxious plants in the district. If one or more of these methods are to be applied, the BLM must determine which herbicide(s) is to be used on target noxious plants, rates of application, application restrictions, which geographic areas would be included, application dates, which plants would be targeted and specific human and non-human health and safety requirements.

Priorities for noxious plant containment or eradication would be set within each resource area. These priorities must consider the point-sources of noxious plant problems, local and regional fish and wildlife resources, rancher interest and involvement, the kind of other vegetation at the treatment site, (including plants relative to the Endangered Species Act), the concern and plans of county weed boards and their supervisors, BLM personnel and other manpower available and availability of funds. Appendix 2.2 illustrates the public land areas known to be infested with noxious plants within each resource area in this district. The BLM will continue to participate in cooperative efforts to map infestations as more information becomes available. Additional information on intergovernmental relationships can be found in the Northwest FEIS pages 14-18.

After considering these factors, a decision can be made under this alternative to do one of the following:

-- Treat the entire area with the goal to eradicate (if possible). This method would be used if the infested area is small or isolated and serves as a point-source for infesting other sites.

-- A containment program would be followed if the infested area is large and eradication is unfeasible. This program may include treating the edges of infested areas to reduce spreading, using the cheaper chemicals (2,4-D and dicamba as compared to picloram) to prevent seed production, or other alternatives (biocontrol, grazing management, fire, sheep, mowing, etc.) to herbicides.

-- A decision not to treat at this time may be made. This would be due to the large extent of the infestation, complexity of vegetation types, species of noxious plants, cost of treatment or lack of cooperation among adjacent operators. The individual County Weed Management Plan per Montana State law prioritizes noxious plant control/eradication program sites.

It is BLM policy to give top priority to noxious plant control projects where a cooperative effort is undertaken among all affected parties.

a. Description of Herbicides Which May be Used:

(1) 2,4-D

The herbicide 2,4-D (2,4-Dichlorophenoxyacetic Acid) is a selective systemic herbicide used on a large variety of broadleafed plants. It is usually formulated in various amine (Dimethylamine salt of 2,4-Dichlorophenoxyacetic Acid) and ester (Isooctyl and Butozyethyl ester of 2,4-Dichlorophenoxyacetic Acid) salts. In general, the amine salts of 2,4-D are highly soluble in water and therefore can be used in water-based formulations. The ester forms of 2,4-D are oil soluble and require the inclusion of an emulsifying agent if they are to be applied as an aqueous solution. Because of their high degree of solubility in oils and most organic solvents, the ester forms of 2,4-D generally tend to be more readily absorbed by plants and consequently have a stronger toxic effect on target species. The ester formulations are more volatile.

Formulations of 2,4-D are absorbed by both plant roots and foliage and are translocated up and down the plant stem. The major sites for 2,4-D accumulation are in meristematic tissues.

For additional, specific information on 2,4-D refer to U.S. Forest Service, August 1984, Pesticide Background Statement, Vol. 1 - Herbicides. Agricultural Handbook No. 633: D-5 through D-157. A copy is available in each BLM Resource Area Office.

(2) Dicamba (Banvel)*

The herbicide dicamba (3,6-dichloro-o-anisic acid) is a selective herbicide used on a large variety of broadleafed noxious plants. The herbicide is readily absorbed by leaves and roots and is readily translocated via both the symplast and apoplast systems. Dissipation of residues of dicamba from treated plants can occur by exudation through the roots into the surrounding soil, by tissue metabolism within the plant and by loss from leaf surfaces and by leaching in coarse textured soils. Dicamba formulations are water soluble and leaching may occur.

For additional, specific information on dicamba refer to U.S. Forest Service, August 1984, Pesticide Background Statement Vol. 1 - Herbicides, Agricultural Handbook No. 633: Di-3 through Di-65.

(3) Picloram (Tordon)*

The herbicide picloram, (4-amino, 3, 5, 6-trichloro- picolinic acid) is a selective herbicide used for control of most annual and perennial broadleaf noxious plants and for general woody plant control. Most grasses are resistant if the chemical does not exceed label rates. Liquid sprays or granular formulations can be applied. Picloram salt formulations are water soluble and leaching may occur in coarse textured soils low in organic matter.

Liquid formulations of picloram translocate through the entire plant, down through the leaves and up through the roots.

Pellet formulations translocate through the entire plant also. However, it enters the plant only by the root. Both liquid and pellet formulations form a control barrier in the upper 6 to 8 inches of soil to stop seed and root sprouts. Dissipation of picloram residues from treated plants can occur by exudation through the roots into the surrounding soil, by tissue metabolism within the plant and loss from leaf surfaces, and by leaching in coarse textured soils.

Caution should be used when transferring livestock from a treated area to a broadleaf crop area. Livestock can be transferred, however, they should be placed in a holding pasture for 7 days before being released in an untreated pasture. Otherwise urine may contain enough picloram to cause injury to sensitive broadleaf plants.

This holding and transfer pattern should continue for 1 complete year after treatment. Do not use manure from animals grazing treated areas to fertilize soil or fields used to grow susceptible broadleaf crops.

---

* Trade names are used only to provide information and do not imply product endorsement.

For additional, specific information on picloram refer to U.S. Forest Service, August 1984, Pesticide Background Statements, Vol. 1 - Herbicides, Agricultural Handbook No. 633: p-3 through p-77.

The above herbicide effects on selected plants are for individual chemicals. These chemicals may be used individually or in combination with other chemicals for improved efficiency and reduced costs. Label restrictions and guidelines will be followed.

It must be recognized that the effects can be and often are, more effective and less costly when chemicals are used in combination rather than individually.

b. Definitions of Eradication and Containment Specific to Herbicides Applications:

(1) Eradication:

Where noxious plants are isolated (along roads, trails or in pastures) or occurring in sparse groups or clumps and are a point source (localized areas from which larger infestations occur) for adjacent area infestations, eradication of the plant population may be attempted. This procedure must be in coordination with similar, intensive eradication attempts by adjacent landowners.

(2) Containment:

This level of noxious plant control would be practiced when the occurrences of the target plant species are so extensive that eradication is not feasible; the complexity and density of vegetation types limit eradication effort; the cost of treatment for eradication is prohibitive; or there is a lack of cooperation among adjacent operators. This treatment level may include one or more of the least costly chemical, biological, mechanical, or fire control methods to control seed formation in the containment area as well as more costly chemicals along the periphery of infestations to prevent spread into adjacent areas.

Please refer to pages 7-8 in the Northwest FEIS, "Weed Management Treatments and Design Features" section for additional information.

c. Potential Hazards Involved in Use of 2,4-D Herbicide (Amine & Ester):

(1) Hazards to Humans:

Harmful if swallowed. Avoid breathing spray mist. Avoid contact with skin, eyes and clothing. Some formulations, such as salts, esters, and concentrated solutions are eye irritants that can cause injury. Some formulations may cause irritation to the skin. Always use recommended safety clothing and wash any contamination off skin.

Refer to the Northwest FEIS, Appendices K (page 189), and N (page 209) for greater detail and information on human health.

For additional, specific information refer to U.S. Forest Service, August 1984, Pesticide Background Statements, Vol. 1 - Herbicides, Agricultural Handbook No. 633: D-19 through D-29.

(2) Hazards to Animals:

Do not graze dairy animals or cut treated forage for hay within 7 days of application.

Formulations of 2,4-D are mildly toxic to mammals and birds. Most ester formulations are toxic to highly toxic to aquatic invertebrates and to fish, while salt and acid formulations are generally only slightly toxic to these organisms.

Refer to the Northwest FEIS, Appendices K (page 189), and N (page 209) for greater detail and information on wildlife and domestic animals.

For additional, specific information refer to U.S. Forest Service, August 1984, Pesticide Background Statements, Vol. 1 - Herbicides, Agricultural Handbook No. 633: D-31 through D-47.

(3) Hazards to Environment:

Do not apply directly to water bodies. Do not contaminate water intended for irrigation or domestic purposes. Do not apply when wind conditions favor drift from target area.

Formulations of 2,4-D are toxic to broadleaf non-target plant species, with the highly volatile esters particularly prone to causing toxic effects in crops close to application sites if care is not taken.

Refer to the Northwest FEIS Appendix K (page 189) for additional information.

d. Descriptions of 2,4-D Herbicides Effects on Target Noxious Plants: 1/

(1) Leafy Spurge:

This is a deep rooted, long-lived perennial plant which spreads rapidly by seeds and underground roots.

Leafy spurge cannot be eradicated with 2,4-D alone. To prevent seed formation use 1.0 to 2.0 pounds active ingredient per acre in early spring when the plant is in its early bud stage. For top growth control apply 2,4-D in the spring and fall. When other herbicides (like picloram or dicamba) are mixed and applied with 2,4-D it is a very effective, economical control method for leafy spurge.

(2) Spotted Knapweed:

This is a biannual or short-lived perennial plant which reproduces only by seeds.

Several years of repeated application would be necessary to obtain eradication using 2,4-D alone. To prevent seed formation apply 2.0 pounds active ingredient per acre in early spring and in the fall. When other herbicides (like picloram or dicamba) are mixed and applied with 2,4-D it is very effective in controlling spotted knapweed.

(3) Russian Knapweed:

This is a long-lived perennial plant that spreads by seeds and underground rootstocks.

1/ Refer to the Northwest FEIS, Appendix E (page 161) for more information.

It cannot be eradicated with 2,4-D alone. To prevent seed formation use 2.0 pounds active ingredient per acre in early spring. For top growth control apply 2,4-D in the spring and fall. When other herbicides (like picloram or dicamba) are mixed and applied with 2,4-D it is very effective in controlling of Russian knapweed.

(4) Diffuse Knapweed:

This is a biannual or short-lived perennial plant which reproduces only by seeds.

Several years of repeated application would be necessary to obtain eradication using 2,4-D alone. To prevent seed formation use 2.0 pounds active ingredient per acre in early spring. When other herbicides (like picloram or dicamba) are mixed and applied with 2,4-D it is very effective in controlling of diffuse knapweed.

(5) Canada Thistle:

This is a deep-rooted, long-lived perennial plant which spreads rapidly by seeds and underground rootstocks.

In rangeland areas, treat twice a year (in bud stage and in the fall) for several years with 1.5 pounds active ingredient per acre. When other herbicides (like picloram or dicamba) are mixed and applied with 2,4-D it is very effective in eradication of Canada thistle.

(6) White Top (Hoary Cress)

This is a perennial plant which reproduces by seeds and horizontal creeping rootstocks.

Several years of repeated application would be necessary to obtain eradication using 2,4-D alone. To prevent seed formation use 2 pounds active ingredient per acre. Treat in early bud stage.

(7) Whitepoint Locoweed:

This is a long-lived perennial plant which has a deep, woody taproot similar to alfalfa. It can be eradicated by spraying with 2.0 pounds active ingredient per acre of 2,4-D ester or low-volatile ester in early bud stage, with follow up treatments as needed.

(8) Field Bindweed:

This is a perennial plant which reproduces by seeds and a network of lateral roots that form vertical shoots.

In rangeland areas, treat twice a year for 2 or 3 years with 1.5 pounds active ingredient per acre. Treat in bud stage and in fall.

(9) Musk Thistle:

This is a biennial plant which reproduces only by seeds.

Fall treatment to rosettes and spring treatment before flower stalk lengthens with 1.5 pounds per acre of active ingredient would eradicate musk thistle. Annual treatments are needed to control new seedlings.

(10) Dalmation Toadflax:

This is a deep-rooted, long-lived perennial plant which spreads by seeds and thick underground roots. It is quite resistant to chemicals and cannot be eradicated with 2,4-D alone. Treatment would prevent seed formation only. When other chemicals are mixed and applied with 2,4-D it is effective.

e. Potential Hazards Involved in Use of Dicamba:

(1) Hazards to Humans:

When used alone there is no specific human health hazard, however, the applicator should always use recommended safety clothing and wash any contamination off skin.

Refer to the Northwest FEIS, Appendices K (page 189), and N (page 209) for greater detail and information on human health.

For additional, specific information on dicamba refer to U.S. Forest Service, August 1984, Pesticide Background Statements, Vol. 1 - Herbicides, Agricultural Handbook No. 633: Di-3 through Di-14.

(2) Hazards to Animals:

When used alone there is no waiting period between treatment and grazing for non-lactating animals. Do not graze meat animals in treated fields within 30 days before slaughter. More severe restrictions exist for dairy animals, therefore read the label for dairy animal guidelines.

Refer to the Northwest FEIS, Appendices K (page 189), and N (page 209) for greater detail and information on wildlife and domestic animals.

For additional, specific information on dicamba refer to U.S. Forest Service, August 1984, Pesticide Background Statements, Vol. 1 - Herbicides, Agricultural Handbook No. 633: Di-9 through Di-19.

(3) Environmental Hazards:

Do not contaminate irrigation ditches or water for domestic purposes. Extreme care is required in applying herbicides in areas where either possible downward movement into the soil or surface washing may cause contact of dicamba herbicide with the roots of desirable plants. Do not spray near sensitive plants if wind is gusty or in excess of 5 mph and moving in the direction of nearby sensitive crops, or if temperature is expected to exceed 85 degrees Fahrenheit as drift is more likely to occur. Refer to Table 2.1 for specific effects of chemicals on non-target species.

Refer to the Northwest FEIS, Appendix K (page 189), for additional information.

f. Descriptions of Dicamba Herbicide Effects on Target Noxious Plants: 1/

(Retreatments may be made as needed on specific plants, however, do not exceed a total of 8 pounds active ingredient per acre during a growing season.)

1/ Refer to the Northwest FEIS, Appendix E (page 161) for more information.

TABLE 2.1
TOXIC EFFECTS ON NON-TARGET SPECIES

Active Ingredient/ Common Names	Likely Application rates mg/m2	Toxicity/ Persistence	Vegetation	Livestock	Fish	Wildlife	Behavior in Soil, Water, Air
2,4-D	50 - 450 mg/m2 or .45 - 4 lbs a.i./ac	Low to moderate toxicity. HL less than a month.	Harmful to many crops, may harm conifers, sagebrush, broadleafs, rabbitbrush, buckbrush, snowberry, for corn 10.0 ppm, sugar beets 0.2 ppm	50 mg/kg/day. No effect (amine) 250 mg/kg/day. Lethal to some (ester). Allowable residue for hay - 300 ppm or rangeland grasses - 1,000 ppm	Toxic at 1-60 ppm (butyl ester).	Toxic to some birds at 400 mg/kg. Relatively non-toxic to bees.	Degradability in soil dependent on microbial activity. Fast in organic and moist soils. Much slower in dry soils. Persistence in water depends on microorganisms. Concentration usually below 100 ppb. Butyl ester has high volatility. Drift problems can occur.
Picloram/ Tordon	50 - 200 mg/m2 or .45 - 1.78 lbs a.i./ac	Slightly toxic. Persistent HL 1-13 months possibly carcinogenic.	Can be toxic, especially if persistent. Broadleaf & woody species susceptible, grasses are resistant. For corn 10.0 ppm, sugar beets 10.0 ppm.	Very low. Allowable residue forage grasses 80 ppm.	Low lethal toxicity to fish. Reports of reduction of survival and growth of fry at 0.035 ppm. Stonefly LC 50 120 ppm.	Low toxicity. Mice LD50, 2000-4000 mg/kg.	Very stable in plants, can be leached, relatively non-volatile. Residues have been detected after 5 years.
Dicamba/ Banvel	50 - 450 mg/m2 or .45 - 4 lbs a.i./ac	Slightly toxic. HL less than 3 months.	Toxic to many trees, shrubs forbs. Varies considerably.	No information. Allowable residue hay 40 ppm. Allowable rangeland grasses 40 ppm.	Toxic at 24 ppm, LC50 trout. Other fish around 100 ppm.	Toxic to some birds (pheasants) 800 mg/kg (LD50). Rabbits-556 mg/kg. Rats 1000 mg/kg (LD50). Relatively non-toxic to bees.	Not readily absorbed by soil. Readily leached. Degradation via microbial action.

HL - half life, ppb - parts per billion, ppm - parts per million, mg/kg - milligram per kilogram per day

[1] Idaho Noxious Weed Control Environmental Assessment

(1) Leafy Spurge, Russian Knapweed, Canada Thistle, Dalmation Toadflax and Field Bindweed:

A dicamba herbicide application rate of 2.0 to 6.0 pounds active ingredient per acre can control/eradicate these noxious plants with treatments in the bud stage and in the fall. Follow-up treatments would be required for several years. Dicamba herbicide is more effective and economical when mixed properly with 2,4-D Amine (Example: 1/2 to 2 lbs. dicamba and 1 to 3 lbs 2,4-D per acre).

(2) Spotted and Diffuse Knapweeds:

A dicamba herbicide application rate of 1.0 to 1.5 pounds active ingredient per acre can control/eradicate these plants with treatments when the plant begins to bolt in the spring. Several years of repeated applications would be necessary to control knapweeds. Dicamba is more effective and economical when mixed with 2,4-D amine.

(3) Musk Thistle:

A dicamba herbicide application rate of 0.5 to 1.0 pounds active ingredient per acre can control/eradicate this plant with treatments in the spring and fall. Annual treatments are needed to control new seedings.

g. Potential Hazards Involved in Use of Picloram (Tordon 22K and 2K):

(1) Hazards to Humans:

Avoid contact with skin and eyes as this chemical may cause irritation and may be harmful if swallowed. Inhalation of this spray mist (22K) or dust (2K) may be harmful, but its not likely to be absorbed through skin. Always use recommended safety clothing and wash any contamination off skin.

Refer to the Northwest FEIS, Appendices K (page 189), and N (page 209) for greater detail and information on human health.

For additional, specific information on picloram refer to U.S. Forest Service, August 1984, Pesticide Background Statements, Vol. 1 - Herbicides, Agricultural Handbook No. 633: p-3 through p-22.

(2) Hazards to Animals:

Picloram has a low order of toxicity to fish, wildlife and animals. There is no waiting period between treatment and grazing of animals. Picloram does not bioaccumulate appreciably in animals and is rapidly excreted, primarily in the urine.

Refer to the Northwest FEIS, Appendices K (page 189), and N (page 209) for greater detail and information on wildlife and domestic animals.

For additional, specific information on picloram and animal toxicity refer to U.S. Forest Service, August 1984, Pesticide Background Statements, Vol. 1 - Herbicides, Agricultural Handbook No. 633: p-3 through p-25.

(3) Environmental Hazards:

Do not apply directly to water bodies or where runoff is likely to occur. Do not treat or allow spray drift to fall onto innerbanks or the bottom of irrigation ditches or other channels that carry water for irrigation or domestic purposes. Soil treated with picloram may be injurous to other desirable plants for a period of 2 years or more depending on rate of application and soil characteristics. Picloram is stable in the dark but breaks down in sunlight. Do not move treated soil to other areas.

Picloram is considered to be a mobile herbicide since its absorption into soil particles is low. It is readily absorbed by plant roots and translocated throughout the plant. Picloram will kill non-target broadleafed plants.

Refer to the Northwest FEIS Appendix K (page 189) for additional information.

h. Descriptions of Picloram Herbicides Effects on Target: 1/

(1) Leafy Spurge, Russian Knapweed, Canada Thistle, White Top, Field Bindweed, and Dalmation Toadflax:

A picloram herbicide application rate of .5 to 1.5 pounds active ingredient per acre can contain/

1/ Refer to the Northwest FEIS, Appendix E (page 161) for more information.

eradicate these plants with treatments applied any time during the active growing period, however, spring or fall applications are best. Follow-up work is necessary each year to control missed seed patches and around the edges of the control area. The residual control period will range from 2 to 4 years depending on soil characteristics, application rates and precipitation.

(2) Spotted and Diffuse Knapweed, Whitepoint Locoweed, and Musk Thistle:

A picloram application rate of .125 to .5 pounds active ingredient per acre can control/eradicate these plants with a treatment in the spring when plants begin to bolt or in the fall. This will control these plants for 2 to 4 years depending on soil characteristics, application rates and precipitation. Follow-up work is necessary each year to control missed seed patches and around the edges of control area.

Table 2.2 summarizes the optimum growth months and chemical application rates described in this section.

C. Alternative Summary

This chapter described the no action alternative and the preferred action alternative for the containment/eradication of noxious plants. It also considered biological, mechanical and fire methods for controlling noxious plants, but until more research is done and found to be economically feasible, they will not be analyzed further. Table 2.3 gives a summary of the no action and preferred action alternatives and their impacts by issue.

D. Emergency and Hazardous Materials Response

1. When accidental misuse, misapplication or spillage occurs the following procedures will be used.

   a. Move and keep people away from incident scene.

   b. Do not walk into or touch any spilled material.

   c. Avoid inhaling fumes, smoke and vapors even if no hazardous materials are involved.

   d. Do not assume that gases or vapors are harmless because of lack of smell.

TABLE 2.2
Optimum Growth Stage, Month(s) for Treatment and Application Rates for Noxious Plants with Specific Herbicides 1/

Weed Species	2,4-D	Dicamba	Picloram (Liquid)	Tank mix 2,4-D & Dicamba	Tank mix 2,4-D & Picloram	Picloram Pellets
Leafy spurge	Early bud stage to maturity (May-June) 1-2 lb/ac	Bud to maturity (May-Nov) 2-6 lbs/ac	Bud to maturity (May-Nov) 1/2-1 1/2 lbs/ac	Early bud stages or maturity (May-June or Aug-Sept) 1/2-1 lb. Dicamba 1-2 lbs 2,4-D/ac	Bud to maturity (May-Nov) 1/4-1 lb. Picloram 1/2-1 lb/ac 2,4-D	Any time shortly before or during normal growing season when adequate moisture is available to carry product into soil (April-Oct) 1/2-1 1/2 lbs/ac
Spotted knapweed	Early spring (May-June) or fall in rosette stage 1-2 lbs/ac	Start of growth thru flowering (May-July) or fall in rosette stage 1-2 lbs/ac	Start of growth thru flowering (May-July) or fall in rosette stage 1/8-1/2 lb/ac	Start of growth thru flowering (May-July) or fall in rosette stage 1/2 lb Dicamba 3 lbs/ac 2,4-D	Start of growth thru flowering or fall in rosette stage 1/8-3/8 lb/ac Picloram 1/2-3/4 lb/ac 2,4-D	Any time shortly before or during normal growing season when adequate moisture is available to carry product into soil (April-Oct) 1/4-1 1/2 lbs/ac
Russian knapweed	Early bud stage to maturity 1-2 lbs/ac	Bud to maturity (May-Nov) 2-6 lbs/ac	When plants are actively growing (May-Oct) 1/2-1 1/2 lb/ac	When plants are actively growing (May-Oct) 1/2 lb. Dicamba 1 1/2 lbs/ac 2,4-D	Bud to maturity (May-Sept) 1/4-1/2 lb Picloram 1/2-1 lb/ac 2,4-D	Any time shortly before or during normal growing season when adequate moisture is available to carry product into soil (April-Oct) 1/2-1 1/2 lbs/ac
Diffuse knapweed	Early spring (May-June) or fall in rosette stage 1-2 lbs/ac	Start of growth thru flowering (May-July) or fall in rosette stage 1-2 lbs/ac	Spring or when weeds are actively growing (May-Aug) or fall in rosette stage 1/8-1/2 lb/ac	When plants are actively growing (May-Aug) or fall in rosette stage 1/2 lb. Dicamba 1 1/2 lbs 2,4-D/ac	Start of growth thru flowering or fall in rosette stage 1/8-3/8 lb/ac Picloram 1/2-3/4 lb/ac 2,4-D	Any time shortly before or during normal growing season when adequate moisture is available to carry product into soil (April-Oct) 1/4-1 lb/ac
Canada thistle	Early bud stage & rosette stage in fall 1-2 lbs/ac	Rosette stage in fall or early bud stage in spring to maturity (May-Sept) 2-6 lbs/ac	Bud to maturity (May-Sept) 1/2-1 lb/ac	Early bud stage or maturity (May-June or Aug-Sept) 1/2-1 lb. Dicamba 1 1/2 lbs 2,4-D/ac	Bud to maturity (May-Sept) 1/4-1 lb Picloram 1/2-1 lb/ac 2,4-D	Any time shortly before or during normal growing season when adequate moisture is available to carry product into soil (April-Oct) 1/2-1 1/2 lbs/ac
White top	Vigorous spring growth to early bloom (May-July) 1-2 lbs/ac	2,4-D is the best for White top	Spring growth to bloom (May-July) 1/2-1 1/2 lbs/ac	Early bud stage or maturity (May-June or Aug-Sept) 1/2-1 lb. Dicamba 1-2 lbs 2,4-D/ac	Bud to maturity (May-Sept) 1/4-1 lb Picloram 1/2-1 lb/ac 2,4-D	Any time shortly before or during normal growing season when adequate moisture is available to carry product into soil (April-Oct) 1/2 - 1 lb/ac
Whitepoint locoweed	Early bud stage & in fall 1-2 lbs/ac	2,4-D, Ester or LVE is the best for Whitepoint locoweed	Spring or when plants are actively growing 1/8-1 lb/ac	Early bud stage or maturity (May-June or Aug-Sept) 1/2-1 lbs Dicamba 1-2 lbs 2,4-D/ac	Actively growing (May-Sept) 1/4-1 lb Picloram 1/2-1 lb 2,4-D/ac	Any time shortly before or during normal growing season when adequate moisture is available to carry product into soil (April-Oct) 1 lb/ac
Field bindweed	Early bud stage & in fall 1-3 lbs/ac	Early bud stage in fall 2-6 lbs/ac	Spring to bud stage or fall 1/2-1 1/2 lbs/ac	When plants are actively growing (May-Sept) 1/8-1/2 lbs Dicamba 3/8-1 1/2 lbs 2,4-D/ac	Bud to maturity (May-Sept) 1/8-1/4 lb Picloram 1/2-3/4 lb/ac 2,4-D	Any time shortly before or during normal growing season when adequate moisture is available to carry product into soil (April-Oct) 1/2 - 1 1/2 lbs/ac
Musk thistle	Actively growing (May-Sept) 1 1/2 lbs/ac	Early bud stage & in fall 2 to 3 years of treatment 1/2 lb/ac	Rosette stage in fall or before flowering stalk lengthens in spring (May-Nov) 1/8-1/2 lb/ac	Early bud stage or maturity (May-June or Aug-Sept) 1/4-1/2 lb Dicamba 3/4-1 lbs 2,4-D/ac	Early growth up to flowering 1/4-1/2 lb Picloram 1/2-1 lb 2,4-D	Any time shortly before or during normal growing season when adequate moisture is available to carry product into soil (April-Oct) 1/2 - 1 lb/ac
Dalmation toadflax	Rosette stage (May-June) 1-2 lbs/ac	Spring or fall (May-Sept) 4-6 lbs/ac	Active growing period (May-Sept) 1/2-1 1/2 lbs/ac	Early growth up to flowering (Mar-June) 1/2 lb Dicamba 1 1/2 lbs 2,4-D/ac	Rosette stage to maturity (April-Sept.) 1/4-3/8 lb/ac Picloram 1/2-1 lb/ac 2,4-D	Any time shortly before or during normal growing season when adequate moisture is available to carry product into soil (April-Oct) 1/2 lb/ac

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1/ Refer to the EIS, Appendix E (page 161) for additional information.

Table 2.3: Alternative Summary Issue

Issues	No Action	Preferred Action
Federal & State Laws	Be in violation	Be in compliance
Agricultural Economy	Detriment	Benefit
Recreation/Aesthetics	Detriment	Maintain/Enhance
Wildlife Population/Habitat	Losses	Losses reduced
Social Well-Being of Impacted Publics	Decreased	Enhanced
Water Contamination	No change (other than noxious plant seeds)	Slight chance
Fishery Resources	No damage	Slight possibility of damage
Non-Target Vegetation	No losses (except from toxic affect of noxious plants)	Expected losses within treatment area
Human Health/Safety	No impact due to chemicals	Possibility of slight impact
Animal Health/Safety	No impact due to chemicals	Possibility of slight impact
Economic Investment	None	Long-term commitment
Soil Productivity	Potential decrease	Potential increase
Attitude of Impacted Public toward BLM	Usually poor	Enhanced
General Public Opposition	Some expected	Some expected

2. Emergency Response Telephone Numbers

The following agencies or organizations provide a variety of services to hazardous material incidents.

Disaster and Emergency Services Division	406/444-6911
Bureau of Land Management Lewistown District Brad Gestring or District Manager	406/538-7461
Bureau of Land Management State Office Peter Bierbach or State Director	406/657-6461
Chemtrec	800/424-9300
Poison Control System	800/525-5042
U.S. Coast Guard/USEPA National Response Center	800/424-8802
Bureau of Explosives American Railroad Association of Railroads	202/835-9500
Burlington Northern Railroad	406/256-4431
EPA, Bob Fox Helena	406/449-5432

The following are good numbers to call regarding:

Waste Disposal Information:

Department of Health & Environmental Sciences - Solid Waste Management Bureau	406/444-2821

Water Related Problems:

Department of Health & Environmental Sciences - Water Quality Bureau	406/444-2406

Radiation Problems:

Department of Health & Environmental Sciences - Occupational Health Bureau	406/444-3671

Pesticide Problems:

Department of Agriculture Field Services Bureau	406/444-2944

3. The following are agency and interagency response documents to be used during emergencies:

   a. Emergency Response Guidebook for Hazardous Materials Incidents, 1984. U.S. Department of Transportation. DOT P 5800.3

   b. Hazardous Materials Emergency Response Guidebook, 1980. U.S. Department of Transportation. DOT P 5800.2

   c. NIOSH/OSHA (National Institute for Occupational Safety and Health/Occupational Safety and Health Act) Pocket Guide to Chemical Hazards, 1978. U.S. Public Health Service, U.S. Department of Labor.

   d. Information Bulletin No. MT-85-49, December 27, 1984. U.S. Bureau of Land Management. Information Summarizing BLM Policy on Management of Hazardous Materials.

   e. Environmental Protection Agency Region VIII, April 1984. Oil and Hazardous Substances Pollution Contingency Plan.

III. AFFECTED ENVIRONMENT 1/

This section describes the environmental, economic and social conditions in the area which may be impacted by the proposed action. Insignificant impacts to climate, geology, minerals, utilities, energy use, and communications sites resulted in no consideration of the resources in this environmental assessment (EA) and the final environmental impact statement (FEIS).

A. Topography

The topography is nearly level to gently sloping on floodplains, terraces and on high benches that are usually dissected by stream channels. The glaciated plains in the northern part of the district are mainly gently undulating to rolling with short steep slopes along dissecting drainages. The acid and calcareous shale areas throughout the district are moderately sloping to very steep with deep draws dissecting the landscapes. The remainder of the district is gently sloping to very steep sedimentary plains, foothills and mountains. The critical geographic locations are lands adjacent to live waters and irrigated lands downstream from potential noxious plant treatment sites.

B. Air Quality

Air quality in the area is good although some dust may be present on windy days near cultivated areas. Smoke may occur in isolated areas due to range fires or burning cropland stubble. These areas are generally small and insignificant.

C. Soils

The soils of the Lewistown District are derived mainly from sedimentary bedrock, glacial till and alluvium. The mountains and foothills are formed from material derived from sedimentary, igneous and metamorphic rocks. Differences in climate, parent material, topography and erosional conditions result in soils with diverse physical and chemical properties. The critical soil properties involved are clay content, organic matter, soil chemicals, infiltration, permeability, runoff hazard and slope of the land.

There are four major kinds of physiographic landscapes where noxious plant infestations may render land unsuitable for livestock, wildlife, forestry, or agriculture. A brief description of each landscape follows:

1. Islands in rivers, floodplains, and terraces with forbs, shrubs, trees, and grasses that are invaded by noxious plants.

1/ Refer to the Northwest FEIS, Chapter 2, Description of the Affected Environment, pages 19-33 for additional information.

These areas have mainly deep stratified loamy or clayey soils with moderate to slow permeability. Small areas of coarse textured, rapidly permeable soils containing little organic matter may occur on floodplains adjacent to some streams and on some islands.

2. Gently rolling to moderately steep glaciated plains and sedimentary uplands dominated by grasses, forbs, and shrubs that are invaded by noxious plants.

   These areas have mainly deep loamy soils with moderate permeability. Small areas in the sedimentary uplands have rapidly permeable sandy soils. The bench edges associated with the glaciated mantle and the adjacent valleys are very gravelly loamy soils over shale with moderate permeability in the glacial mantle and very slow permeability in the underlying shales.

3. Steep dissected shale breaks along the edges of stream or river valleys with complex, but sparse, vegetation cover that is invaded by noxious plants.

   These areas have mainly shallow to deep clay soils over shales. The soil surface is usually granular clay with very slow permeability throughout the profile.

4. Mountain and foothills country with intermixed areas of forest and grassland vegetation that is invaded by noxious plants.

   These areas are dominated by deep to shallow loamy soils with moderate permeability. Rock fragments are common in most soils associated with the mountains.

D. Vegetation

The district consists of three broad vegetative category types: upland prairie, riparian, and woodlands.

The upland prairie consists primarily of a "mixed grass" type. Major forbs are Hood's phlox, scarlet globemallow and prickly pear. Major shrubs are fringed sagewort, silver sage and big sagebrush.

Riparian areas contain trees and shrubs commonly consisting of snowberry, chokecherry, willows, cottonwoods and aspen. These areas also contain various forbs and grasses.

Woodland areas often contain grass species of bluebunch wheatgrass and pinegrass. Common forbs are lupine, bluebells, crocus, death camas and mustard. Trees and shrubs commonly occurring are ponderosa pine, Douglas-fir, wild rose and snowberry.

The major vegetation type on public lands in the Lewistown District is the upland prairie type (Appendix 3.1 is a list of the principal native plants in the Lewistown BLM District). The short and mid grasses, typical of the northern Great Plains are dominant. Other vegetation types commonly found are sagebrush, greasewood, saltbush, juniper, deciduous shrubs and deciduous trees.

The grasslands are predominantly a grama-needlegrass-wheatgrass association with variations because of soil, climate, exposure, slope and ecological condition. Some of the dominant grasses are blue grama; bluebunch, western and thickspike wheatgrasses; needleandthread; prairie junegrass; threadleaf sedge; and Sandberg bluegrass.

Sagebrush is typically found on the fine textured soils and along stream bottoms and floodplains. Woodland areas are common in the Breaks of the Missouri River and on other rough lands in the district. Thickets of such shrubs as buffaloberry, chokecherry, snowberry, serviceberry, willow and wildrose are found along streams and in draws. The more mountainous areas in the district are predominantly a conifer and mountain grassland type.

Much of the district was homesteaded after the 1900's and later purchased by the Federal government under the Bankhead-Jones (Land Utilization) Act. Evidence of cultivation remains on these lands as shown by plow furrows, changes in plant composition and fields of crested wheatgrass. Naturally revegetated fields ("go back" areas) on silty sites are predominantly needleandthread; on sites with more clay, western and thickspike wheatgrass are dominant. Blue grama is greatly reduced on these areas some 45-60 years since the last tillage. Crested wheatgrass is sometimes intermingled with native range on the public lands due to invasion from old adjacent fields.

Ecological range conditions in the Lewistown District vary from poor to excellent. About 64% of the public lands are in good to excellent condition (Prairie Potholes EIS).

Deteriorated range sites near livestock watering facilities and in overgrazed pastures have a predominance of increaser and invader type plant species. Vegetation commonly found on these sites include blue grama, fringed sagewort, broom snakeweed, Hood's phlox, plains prickly pear, scarlet globemallow, and clubmoss, and in some places noxious plants.

These fair to poor range condition sites also become susceptible to invasion of undesirable plant species such as leafy spurge, knapweeds, and Canada thistle.

Infestation of noxious plants range from solid stands to isolated scattered (less than 1% canopy cover) infestations. These infestations occur not only on sites of low ecological status but on sites that have reached their potential natural community.

No Federally designated threatened, endangered or sensitive plant species are known to occur in the Lewistown District.

E. Water

The climate of the Lewistown District is typically mid-continental, ranging from semi-arid in the plains and intermountain basins to sub-humid in the mountains. Precipitation usually ranges from 12-16 inches yearly. High runoff can be caused by several types of climatological events. Such events include localized summer rains and low intensity rainfall on already melting snow packs.

Numerous glacial lakes, stockwater ponds and streams occur throughout the district. Examples include large storage reservoirs such as Fresno, Nelson, Tiber and Fort Peck. Perennial streams in the district include Birch Creek, Elk and Cutbank Creeks; the Judith, Marias, Dearborn, Sun, Smith, Milk, Musselshell and Missouri Rivers.

Water sources in this area vary from medium to good quality. Dissolved solids in prairie streams and ponds are primarily sodium sulfate and sodium bicarbonate. The higher quality streams are located in the southcentral and southwest portions of the district. These streams are associated with mountains and foothills.

Alluvial deposits along principal drainageways, which are composed mainly of silt, sand, gravel and cobbles, are the most permeable aquifers in the area. This type of shallow aquifer is most susceptible to ground water contamination from surface activities such as chemical applications.

The major use of runoff water from public lands in the district is agriculture related. Upland sources are used to water livestock and wildlife while lower main stream supplies are used for varying types of irrigation as well as for livestock and wildlife.

F. Wildlife

The Lewistown District contains a variety of wildlife habitats. The southern and western portions contain mountainous terrain, the Little and Big Belt and Judith Mountains and the Rocky Mountain Front, respectively (Appendix 3.2 is a list of the principal wildlife species found in this district). Here, healthy populations of deer, elk, bighorn sheep, and mountain goats exist. Numerous wildlife ranges dot the foothill areas. Habitats on the foothill areas generally consist of ponderosa pine or limber pine/grasslands which can grade into alpine zones at the extreme edges of the area.

Foothills at the lower elevations grade into large expanses of rangeland areas dissected by numerous streams and rivers that drain to the Missouri. Prairie areas, having sagebrush types, contain extremely high value wildlife habitats as do the mountain foothills and riparian habitats. Agricultural areas are intermixed throughout the native prairie and are important to introduced ring-necked pheasants and Hungarian partridge.

Riparian habitats are the highest value wildlife habitats in the district and are critical to the survival of deer, passerine birds and pheasant populations. They are also extremely important to a variety of raptors and predators.

Most of the district is important to waterfowl. Numerous potholes and reservoirs scattered throughout the district and along the water courses are waterfowl production areas. The most northerly portion of the area is part of the famed Prairie Pothole Waterfowl Production area and is especially important as duck and goose producing areas.

Many wildlife species of less economic importance are found throughout the district, and are too numerous to mention in this report. Generally, the highest densities of small mammals and non-game birds are also located along the water courses.

Valuable fisheries occur in the area. The highest values occur in waterways, lakes and reservoirs closest to the mountains where water quality is highest. The Missouri drainage above Great Falls is an especially high quality trout fishery. The Missouri River below Great Falls, the Milk River, and the Musselshell River are good warm water fisheries. In addition, numerous ponds and reservoirs throughout the district have been stocked and are providing numerous fishing days for enthusiasts.

This discussion has dealt only with the principal wildlife species in the affected areas (see Appendix 3.2).

G. Threatened and Endangered Species

Three mammals and two birds of Endangered Species Act status exist in or have potential habitat in the district.

The threatened grizzly bear inhabits the Rocky Mountain Front as part of the Northern Continental Divide population. Most of the front has been designated as occupied habitat. Important habitats for the bear extend east from the mountains down along the riparian waterways which drain the front. These riparian extensions are especially important forage and cover areas during spring and summer and can be important when berries ripen in the fall.

The Rocky Mountain Front area has also been designated as recovery habitat for the gray wolf (endangered), although little wolf activity has been documented here in recent years. Ungulate (deer, elk, moose) winter ranges along the front are especially important as these species are the principal prey of the wolf.

Potential habitat for the black-footed ferret (endangered) exists on black-tailed prairie dog towns. The highest density of prairie dog towns occurs in Phillips County. Though there have been no confirmed ferret sightings, intensive inventories of prairie dog towns are underway by the State of Montana and private organizations.

The bald eagle (endangered) winters along the water courses in the district and is a common spring and fall migrant. Suitable nesting habitat exists for potential nesting along the streams and along river cliffs, little nesting activity is documented.

Historic peregrine (endangered) falcon habitat occurs along the Rocky Mountain Front, down the Marias River and in the Kevin-Sunburst area of Toole County. These areas are targeted for reintroduction efforts in the near future, possibly as early as 1985.

H. Aesthetics

Visual resource management (VRM) classes and objectives have been completed for the entire Lewistown District. These range from Class I (most restrictive) to Class IV (least restrictive). These classifications prescribe a level of acceptable change to the characteristic landscape from a visual resources standpoint. The visual contrast rating process provides a means for determining visual impacts and for identifying measures to mitigate these impacts. This rating which is essentially a guide for management will be done for any noxious plant control project proposed for highly sensitive areas. This includes but is not limited to: (1) VRM Class I II and III areas with a high sensitivity level; (2) areas under interim wilderness management; (3) public use sites such as campgrounds, picnic areas, trails, rivers; (4) major roads; and (5) special management areas such as outstanding natural area, Areas of Critical Environmental Concern (ACECs) for scenic values, wild and scenic rivers, and wilderness areas.

I. Recreation/Wilderness

The public lands in the Lewistown District are popular for hunting, boating, camping, driving for pleasure, fishing, sightseeing, and winter sports which amounts to approximately 100,000 visits annually. Some of this use is associated with the Upper Missouri National Wild and Scenic River, Rocky Mountain Front Outstanding Natural Areas (ONA), Lewis and Clark National Historic Trail, Square Butte ONA, Little Rockies Recreational Area and the Judith Mountains Recreation Area.

Currently, no acreage has been designated as wilderness within the district, but 44,920 acres in three wilderness study areas (Cow Creek, Antelope Creek, and Burnt Lodge) have been recommended as suitable.

J. Livestock

Livestock grazing is an important use of the public lands. In the Lewistown District, 1,485 operators graze cattle, sheep, and horses, as authorized by permits and leases, on 1,775 grazing allotments. About 559,000 animal unit months (AUMs) of grazing use occurs annually. About 200 allotment management plans are in existence as of the end of fiscal year 1984.

K. Economics

The Lewistown District manages approximately 3,500,000 acres of public rangeland with 559,000 animal unit months allocated to livestock. These public lands comprise 25% of the total rangeland within the 16-county area which contains this district.

Agriculture is a major industry in the 16-county area with receipts from livestock and crops of $220,000,000 and $435,000,000 respectively in 1981 (Montana Agricultural Statistics 1983). It is estimated that BLM rangeland contributed $10,500,000 (5%) to area livestock sales in 1981 (based on total ranch revenue from livestock sales divided by the number of AUMs (all feed sources) required to produce those sales, $18.78/AUM, BLM Ranch Budget Linear Programming Model). Earnings for the agricultural industry amounted to $110,000,000 in 1982 for an estimated 12,000 farm and ranch workers which comprise 11% of the 1982 work force in the 16-county area (Regional Economic Information System, Bureau of Economic Analysis, 1984). This does not include workers in the agricultural processing, retail trade or other sectors of the economy. Total employment, from sales of agricultural products is estimated at 39,000 workers which comprise 37% of the 1982 work force in the area (based on coefficients from the BLM Montana Economic-Demographic Assessment Model).

Currently knapweeds, leafy spurge, whitepoint locoweed, Canada thistle and dalmation toadflax are the dominant noxious plants that infest portions of the 16-county area. The current locations of these infestations and the loss in agricultural, wildlife and recreational resources are not known throughout the area. The Marias River Basin Weed Control, Inc. estimates that 18% (960,000 acres) of the land area in Glacier, Liberty, Pondera, and Toole Counties is infested by one or more types of noxious plants. Infestations of noxious plants are estimated to reduce livestock forage production by 63-90% on weed infestation sites (French et al. 1983, and Bucher 1983). Table 3.1 shows the projected rate of increase for the two most common noxious plants and a third category (other noxious plants) in the Lewistown District. It also shows the projected loss of AUMs as noxious plants increase. Data is not available to estimate the loss in wildlife habitat.

Table 3.1: Projected Rate of Increase and AUM Losses as Noxious Plants Increase from a 1 Acre Base at Specific Time Intervals.1/

		Acres Infested and Loss in Productivity for Selected Years					
Species	Units	1 yr.	10 yrs.	20 yrs.	30 yrs.	40 yrs.	50 yrs.
Knapweeds	Acres Infested	1	4.00	16.40	66.20	267.90	1,083.70
	Loss In AUMs2/	.10	.40	1.64	6.62	26.79	108.37
Leafy Spurge	Acres Infested	1	3.10	9.60	30.00	93.10	289.00
	Loss In AUMs2/	.10	.31	.96	3.00	9.31	28.90
Other Noxious Plants 3/	Acres Infested	1	1.50	2.20	3.20	4.80	7.10
	Loss In AUMs2/	.10	.15	.22	.32	.48	.71

1/ Assumed average rates of spread are 15%/yr. for knapweeds, 12%/yr. for leafy spurge and 4%/yr. for other noxious plants.

2/ Assumes 6.3 acres/AUM with an average 63% reduction in forage.

3/ Includes Dalmation toadflax and whitepoint locoweed.

One acre of knapweeds could spread to 1,000 acres within 50 years assuming an annual rate of spread of 15%. This damage to rangeland and cropland could have a long-term detrimental impact on local ranchers and the agricultural industry.

Other economic conditions of the district are analyzed in the Prairie Potholes Grazing Environmental Impact Statement (EIS), Missouri Breaks Grazing EIS, Missouri Breaks Wilderness EIS and the Headwaters Resource Area Management Plan EIS.

L. Social Conditions

The 16 counties in the Lewistown District had a total population of 220,697 in 1980; a 4% increase since 1970. The area exhibited fairly stable population characteristics during the 1970s with the exception of Valley County which had an 11% decrease in population from 1970 to 1980 and Lewis and Clark County which had a 29% increase. Communities in the area with a 1980 population greater than 2,500 are Great Falls (56,725), Lewistown (7,104), Cut Bank (3,688), Helena (23,938), Conrad (3,074), Shelby (3,142), Glasgow (4,455) and Havre (10,891). Social conditions of the area are analyzed in the Prairie Potholes Grazing EIS, Missouri Breaks Grazing EIS, Missouri Breaks Wilderness EIS and the Headwaters Resource Area Management Plan EIS (available at the Lewistown District BLM Office).

IV. ENVIRONMENTAL CONSEQUENCES

This section provides a description of the consequences and effects of implementing each alternative in environmental change, costs, and consumable values produced. A primary purpose of this section is to describe the expected changes in quantitative or qualitative terms to assist in evaluating and contrasting the alternatives.

A. No Action (No Containment/Eradication Program) 1/

The no action alternative allows no containment or eradication efforts to stop the growth and further spread of noxious plants.

Noxious plants would continue to spread; reducing the productivity of rangeland, grazable woodland, adjacent farmland and wildlife habitat. The consequent economic losses and reduced habitat and forage may impact the total productivity of the ecosystem. Private landowners and state and Federal taxpayers would face increased economic burdens to combat unchecked noxious plants on lands adjacent to those administered by BLM.

Each small noxious plant infestation has the potential to become 800 actual acres, based on the rate of spread of leafy spurge observed during a 40 year period (1935-75)in Valley County, Montana. Livestock, wildlife and birds spread the plant seeds with their feces, feet, and hair to upland areas and farmland. Some noxious plant seeds are spread rapidly by their ability to attach to animals. Other local transportation sources include water, wind, hunters, vehicles, ranch equipment and hay.

Streams would continue to carry seeds downstream and infest other areas. It is expected without control that a significant noxious plant increase would occur on rangeland, woodland and on lower sections of waterways in a few years.

In the long term, the spread of noxious plants would reduce livestock and wildlife forage production significantly and could adversely affect the recreational experience of visitors who are familiar with the native flora. These plants are extremely competitive and crowd out native plants. Without eradication or substantial reduction of these noxious plants, the long-term native vegetative communities for wildlife and domestic livestock would decrease in quality and quantity.

1/ In addition, this alternative was analyzed in the Northwest Area Noxious Weed Control Program EIS, 1985. Refer to Chapter 3, page 36-55, Final Environmental Impact Statement (FEIS).

However, the no action alternative would result in no damage to or pollution of water quality other than noxious plant seeds, aquatic habitats, fish populations; no loss of terrestrial wildlife habitat; no abrupt decrease in wildlife populations due to a sudden change in habitat; and no cultural or historic value losses.

1. Soil and Water

Some noxious plants (like knapweeds) add inhibiting chemical toxins to the soil that weakens most native plants which are then crowded out by the competitive noxious plants. This reduces soil vegetative ground cover and increases water erosion potential.

This alternative would allow the water in streams and drainages to carry noxious plant seeds to new sites or reinfest previously treated sites.

2. Vegetation Relative to Livestock

The no action alternative would result in a rapid expansion of noxious plants which weaken or replace most native plants. Refer to Appendix 3.1 for a list of principal plants in the Lewistown District. There may therefore, be less usable forage for cattle and horses. Sheep and some wildlife species do graze on many plants classified as noxious. This helps to contain the noxious plants but usually will not eradicate them. They do most of their grazing during the vegetative stage of plant growth, thereby preventing seed stalk formation.

3. Recreation, Wilderness and Aesthetics

In the short term, the spread of noxious plants would not have a significant impact on recreation, wilderness study areas or aesthetics. However, in the long term, the reduction of native forage production could adversely impact wildlife numbers and hunter success. Recreational use and aesthetics would be affected as noxious plants become dominant along rivers, streams, trails, camp sites, picnic areas and roads.

4. Economics

This analysis examines the relative economic aspects of not controlling noxious plants on a given tract of land. It is important to note that there exists a variation in rates of spread, weed control costs and range productivity. This analysis is intended to provide a general understanding of the benefits and costs of noxious plant control, and the relative economic consequences of the alternatives.

The economic problem posed by noxious plants is the decrease in livestock forage production and crop yields caused by weed infestations. It is estimated that without containment or eradication, the infestation of knapweeds could increase annually by 15%, leafy spurge by 12% and other noxious weeds could increase by 4%. 2/ This damage to rangeland and cropland could have a long-term detrimental impact on local ranchers and the agricultural industry.

For every 46,000 acres of public rangeland infested by noxious plants, one job could be lost in agriculture along with the full time equivalent of four jobs in other sectors of the economy (based on coefficients from the BLM Montana Economic-Demographic Assessment Model).

The loss in public benefits incurred over time can be measured by today's value (present value) of the decline in forage productivity. For each acre of infested rangeland the annual value of livestock forage production lost is $0.93 (assumes 6.3 acres/AUM with a 63% reduction in forage due to noxious plants and forage valued at the 1983 private grazing land lease rate of $9.23/AUM).

For each acre currently infested by knapweeds the present value of the loss in public benefits over the next 50 years is $330 (assumes an interest rate of 7 7/8%). For each acre infested by leafy spurge the present value is $147 while for other noxious weeds the present value is $21. This assumes only a loss in livestock forage productivity and would be greater if the potential loss in crop yields and wildlife habitat was included. If 10% of the infestation was on cropland, the present value of public benefits lost over the next 50 years would be $1,219 for each acre of knapweed infestation (cropland is valued at an annual amount of $25/acre and assumes a 50% loss in yields with fallow every other year). These values account for the cumulative impact from the spread of noxious plants to uninfested areas.

Noxious weed infestation from foothill areas to winter ranges for ungulates could reduce important wildlife habitat. The number of elk and deer would decline as would recreation use. The economic value of this recreation use would be lost in the long term.

2/ These estimates of weed expansion rate per year are based on Lewistown District data derived from specific persons and agencies such as various county weed boards and BLM area actions. The reader is referred to the FEIS, Appendix C-1, page 152 for regional estimates which may differ slightly.

It becomes apparent that noxious weeds, primarily knapweeds, pose a potential economic loss in public benefits to the nation and may also have an impact on the earnings and agriculture employment for the study area.

5. Social Considerations

With increased infestations of noxious weeds this alternative could result in negative attitudes toward BLM. The social well-being of affected ranch families may decrease in the long term.

6. Impacts on Human Health,

Northwest Area Noxious Weed Control Program, FEIS, page 50-55

B. The Preferred Alternative (Chemical Application) 3/

1. Topography

There are no anticipated impacts for this environmental component. However, the topography would have a substantial impact on the cost and logistics of applying chemicals.

2. Soil and Water

Some soil trampling could occur by work crews. Vehicles traveling off roads could disturb soils. However, this should cause little or no soil erosion due to the small area affected and the low intensity of these disturbances.

Soils could be contaminated for as long as 3-5 years or longer with the herbicide picloram, although that time period varies as to soil textures and application rates. The higher the organic matter context in the soil and the lighter the application rate the quicker the chemical would break down.

The behavior of a chemical substance in soil is determined by a number of properties relating to both the chemical and the soil environment. Properties of the chemical include water solubility, adsorption onto soil particles, chemical degradation, degradation by soil organisms and volatility. Environmental properties include precipitation levels, amount of sunlight, as well as soil textures, organic matter content, temperature, and pH. Chemical substances that are highly soluble in water tend to be readily leached from soil, particularly if there are large amounts of precipitation and/or the chemical does not tend to adsorb readily to soil particles.

3/ Refer to Chapter 3, FEIS, page 36-55 for additional analysis of mechanical, burning, selected manual methods, and selected disease and insect controls.

Onsite evaluations are needed to determine soil and landscape features that would guide the method and intensity of treatment for noxious plants on specific sites. Coarse textured soils and those subject to flooding require the most intensive study and planning in developing the proper methods of management for the area. Prior to initial treatments, the specific area soils would be checked to see if any limiting soil properties are present.

Refer to page 36, FEIS for additional information.

The behavior of chemical substances in water is influenced by water solubility, absorption onto sediment, chemical and microbial degradation, and environmental conditions. Chemical substances, particularly agricultural chemicals such as herbicides, can enter aquatic systems in various ways, including direct application to surface waters, drift from spray operations close to surface waterbodies, mobilization of residues in ephemeral stream channels, overland flow, and leaching. The relative contribution of chemicals to waterbodies by any of these routes results from an interaction of the properties of the chemical and specific environmental factors.

Generally, accidental crop or water contaminations could occur by applying herbicides during windy conditions or near irrigation facilities.

Research has shown that the herbicides presented in this assessment are not highly toxic to fish and fresh water invertebrates (except 2,4-D esters which are toxic to highly toxic to aquatic species). For additional, specific information on 2,4-D refer to U.S. Forest Service, August, 1984, Pesticide Background Statement, Vol. 1 - Herbicides. Agricultural Handbook No. 633: D-5 through D-157. A copy is available in each BLM Resource Area Office.

The most common pollution of water courses or bodies is in runoff water from treated areas. Runoff water may be contaminated during application when chemicals are introduced directly, or after application by several transport mechanisms. Research related to contaminated runoff is limited due to lack of reproducibility of laboratory and field tests. Conditions in these tests are extremely variable. Accidents or improper application of herbicides can result in large concentrations of herbicides being introduced into a stream or irrigation system. Table 2.1 shows the toxicity levels of 2,4-D, dicamba, and picloram for some animals and plants.

There are higher potentials for contamination of underground waters from chemical pesticide treatments; particularly in alluvial soil areas along drainageways where soil textures are sandy and ground water is within 10 feet of the surface.

Refer to page 38, FEIS for additional information.

3. Vegetation

Special care must be taken when using chemical methods to control outbreaks of noxious plants because of their possible adverse impact on the total biological community. Chemical applications would only be used to control small areas of noxious plants in wilderness study areas.

Vegetation would be contaminated for a short time following spraying. This could cause chemical intake by various livestock and wildlife species. Some non-target broadleaf vegetation would also be lost within the spraying area.

The eradication of noxious plants by spraying would reduce competition for light and water for other more desirable plants.

The impact of the Proposed Action on threatened and endangered plant habitats has been evaluated in accordance with the Endangered Species Act. Based on currently available information, there are no threatened, endangered or sensitive plant species in the Lewistown District.

Refer to page 40, FEIS for additional information.

4. Economics

The control of noxious plants can be accomplished by containment or eradication. For each acre of rangeland treated, the increased value of livestock forage production would be $0.93 per year. Although some of these lands are not highly productive, they are a source for noxious plants that could spread to other lands where production per acre is much higher. The costs of noxious plant control average about $50 per acre, depending on the type of herbicide and application technique. With the initial application and necessary follow-up work, these costs could total about $150 per acre for knapweeds, $500 per acre for leafy spurge, and $90 per acre for other noxious weeds over a 50-year period. Noxious plant containment costs can be prohibitive and cannot be covered by 1 year's benefits. They must be compared over the long term with the increased forage production of the lands that would not be infested because of containment or eradication.

A comparison of the present value of the costs with the present value of the loss avoided (No Action) on knapweed infestations for a 50-year period indicates a benefit-cost ratio of 2.7:1 for each acre treated (see Table 4.1). The benefit-cost ratio for leafy spurge and other noxious plants is 0.4:1 and 0.3:1 respectively for each acre treated. These ratios do not include the benefits from maintaining wildlife habitat and assumes only rangeland would be infested with noxious plants.

Appendix 4.2 explains the weed control investment analysis procedures for range improvement projects using the rangeland investments analysis program (SageRam). The benefit-cost ratios account for the cumulative impact from the spread of noxious plants to uninfested areas.

If extreme care is used while conducting the spray program, contamination of irrigation systems and river water should be insignificant. Economic values associated with agriculture and recreational fishing would not be affected. Some damage of plant species important to wildlife may occur with any spray program. Of particular importance is the possible destruction of wildlife nesting habitat and loss of broadleafed cover for hunted species. Economic values associated with consumptive and non-consumptive use of wildlife could be affected if damage occurred to high value habitat areas.

Table 4.1. Present value of benefits (loss avoided) and costs for containment of noxious plants over a 50-year period (interest rate of 7 7/8%).

Species	Present Value of the Benefits	Present Value of the Cost	Benefit-Cost Ratio
Knapweeds	$330	$123	2.7:1
Leafy Spurge	$149	$337	0.4:1
Other Weeds	$ 21	$ 77	0.3:1

Refer to page 48, FEIS for additional information.

5. Social Conditions

The increased vegetation associated with this alternative would enhance the social well-being of affected ranch families in the long term. This would produce favorable attitudes toward the BLM from ranchers and those associated with the ranching industry.

Refer to page 49, FEIS for additional information.

This alternative may produce some negative attitudes toward BLM by the hunting public concerned with loss of wildlife habitat and from the general public concerned with wide-scale use of herbicides.

6. Human Health

Refer to FEIS Appendix N (page 209) the "Worst Case Analysis" on human health; and Chapter 3, FEIS, page 50.

7. Wildlife Habitat

Riparian wildlife habitats and other woody vegetation areas are impacted by herbicide applications. When applied to eradicate noxious plants in small patches or over extensive areas the herbicide used to kill plants will kill forbs and woody vegetation. Refer to "Control of Noxious Plants in Wooded Uplands, Wooded Floodplains, and Riparian Habitats - Appendix 4.1." The rate, method of application, kind of chemical used and the frequency of application will determine the total impact on the forbs and woody vegetation in valleys, woody draws and on northern slopes of uplands.

The riparian habitats, woody floodplains and draws are important as food and cover for wildlife. Therefore, careful study is needed to determine the kind and extent of treatment, or if any treatment would be applied to a specific area.

In areas where herbicides are used to eradicate noxious plants in complex vegetation types, including forbs and woody plants, the loss of critical cover and food would impact many wildlife species through the loss of reproductive habitat, winter ranges, and escape cover.

When a decision is made to treat noxious plants with herbicides the degree or intensity of treatment (containment versus eradication) would have been made by district personnel. Each herbicide or combination of herbicides considered for use would be evaluated based on hazards to humans, animals and the environment. Other elements considered would include the proximity of plants to water bodies, the vegetation types present, the proximity of agricultural crops to treatment area and the availability of funds and personnel for the control effort. All of these elements would be considered in a Pesticide Use Proposal and the associated documents.

Refer to page 45, FEIS for additional information.

8. Air Quality

Air quality could be temporarily decreased in the immediate spraying area as chemicals could temporarily pollute the air. However, this would last only for a very short period as the spray would dissipate or drop to the ground.

a. Liquid formulations of herbicides, applied with backpack, would be applied with low pressure sprayers to minimize wind drift.

b. To avoid wind drift and volatilization, applications would proceed only if surface wind velocity is less than 8 mph and air turbulence does not interfere with normal spray patterns.

c. Liquid applications would be made using a nozzle to limit wind drift.

Refer to page 36 and 50, FEIS for additional information.

9. Cultural Resources

Refer to page 47, FEIS for an analysis of these values.

10. Visual Resources Management

Refer to page 47, FEIS.

11. Wilderness and Special Areas

Refer to page 48, FEIS.

V. MONITORING AND STUDIES

This environmental assessment (EA) incorporated the entire Monitoring Plan, Table 5.1, from the Record of Decision, April 7, 1986, of the Northwest Area Noxious Weed Control Program FEIS, 1985.

In addition, specific monitoring plans will be developed by the site-specific EA or "exception analyses" for each local action within the district. All factors listed in Table 5.1 will be considered for each action, but additional values and concerns may be added as necessary.

Much of the monitoring will be accomplished through normal operating procedures, such as contract administration and staff review. Special systems have been developed to measure the biological and physical impacts of plan implementation. For example, control effectiveness will be monitored by post-treatment surveys designed to measure the actual effectiveness of a treatment or combination of treatments. When appropriate, monitoring will include recommendations for additional treatment and/or site rehabilitation.

Table 5.1 Monitoring Plan

Monitoring Element	Method	Frequency	Characteristics Evaluated
Pretreatment Survey	On site visual inspection	Each treatment area	Species present, density, endangered species present, control options, method chosen
Post Treatment Survey	On site inspection	Each treatment area	Effectiveness, need for retreatment, corrective measures or mitigation
Pesticide Use Proposal	Review of proposal and EPA registration by authorized certified applicator.	Prior to any herbicide application	Proposal compared to EPA registration requirements and ROD compliance
Water Monitoring Samples	Pre and post treatment water samples when program is near potable sources and could get into water.	As needed	Potential water contamination.
Coordination Monitoring	Weed management plans submitted to Washington D.C.	Yearly	Coordination of plan

Biological Establishment	Survey of biocontrol agents release and establishment	State/District yearly	Establishment, effective- and rate of spread of biological control agents
Threatened and Endangered Surveys	Survey for T&E species prior to action	Each project	Presence of T&E species
Cultural Resource Surveys	Survey for archaeological and historical resources	Each project which involves surface disturbance	Presence of cultural resources

VI. CONSULTATION AND COORDINATION

(For the Lewistown District Programmatic EA exclusive of the Northwest Area Noxious Weed Control Program FEIS.)

Those agreements and documents must be prepared by BLM prior to any application of herbicides: cooperative agreements with county weed boards, a Pesticide Use Proposal, a Narrative Justification, and an Environmental Assessment Work Sheet. These documents would meet the requirements and guidelines established in the County Noxious Weed Management Act and the Federal National Environmental Policy Act.

The Montana Department of Agriculture requires that an annual report of pesticide application, for general use pesticides, be sent to its Helena Office before January 15, of the following year.

A daily record of pesticide application, and a "Monthly Record of Restricted Use Pesticide Application" must be maintained in the Lewistown District Office. Information must be completed and sent to the Montana Department of Agriculture in Helena by the 15th of the following month, even if no pesticides were applied.

Noxious plant control has been an ongoing program in the Lewistown District for several years. The entities shown here have been consulted in previous years and will continue to be consulted as the program continues. They have provided valuable information in identifying appropriate control measures.

Agencies and Other Entities Consulted

A. U.S. Department of Agriculture
    1. Forest Service
    2. Soil Conservation Service
    3. Agricultural Stabilization & Conservation Service

B. U.S. Department of the Interior
    1. Bureau of Land Management - State & Washington Offices
    2. Fish & Wildlife Service

C. Montana Department of Agriculture
    1. Environmental Management Division
    2. Department of Fish, Wildlife & Parks

D. Montana State University Research Centers

E. County Extension Service

F. County Weed Boards & Supervisors in Lewistown District

G. Environmental Protection Agency

H. Range Permittees

It is BLM procedure that noxious plant containment/eradication actions in sensitive environments require a comprehensive interdisciplinary environmental analysis and close coordination with the Montana Department of Fish, Wildlife and Parks and the U.S. Fish and Wildlife Service. Sensitive environments include but are not limited to riparian ecosystems including islands and oxbows, upland woodlands, all wetlands, and community watersheds.

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APPENDIX 1.1 : CARLSON-FOLEY ACT

PUBLIC LAW 90-583
90th Congress, S. 2671
October 17, 1968

AN ACT

82 Stat. 1146

To provide for the control of noxious plants on land under the control or jurisdiction of the Federal Government.

Noxious Plant control.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the heads of Federal departments or agencies are authorized and directed to permit the commissioner of agriculture or other proper agency head of any State in which there is in effect a program for the control of noxious plants to enter upon any lands under their control or jurisdiction and destroy noxious plants growing on such land if---

(1) such entry is in accordance with a program submitted to and approved by such department or agency: Provided, That no entry shall occur when the head of such Federal department or agency, or his designee, shall have certified that entry is inconsistent with national security;

(2) the means by which noxious plants are destroyed are acceptable to the head of such department or agency; and

(3) the same procedure required by the State program with respect to privately owned land has been followed.

Sec. 2. Any State incurring expenses pursuant to section 1 of this Act upon presentation of an itemized account of such expenses shall be reimbursed by the head of the department or agency having control or jurisdiction of the land with respect to which such expenses were incurred: Provided, That such reimbursement shall be only to the extent that funds appropriated specifically to carry out the purposes of this Act are available therefor during the fiscal year in which the expenses are incurred.

no funding

Appropriation authorization.

Sec. 3. There are hereby authorized to be appropriated to departments or agencies of the Federal Government such sums as the Congress may determine to be necessary to carry out the purposes of this Act.

Approved October 17, 1968

Appendix 2.1: - Methods of Herbicide Application

Types of Application Equipment:

A. Liquid Application

1. Slip-in Tank Applicator

This applicator can be used for large or small infestations. Handguns, broadcast jets, or boom-type nozzles can be used dependent upon type of vegetation, size of area and type of terrain.

Advantages:

Adjustable droplet size by changing nozzle tip
Adjustable pressure
Adjustable volume
Motor powered
Larger carrying capacity

Disadvantages: Can only treat where you can drive. With boom or broadjet often hits nontarget plants. Chance of drift is high if large droplet size nozzles and low pressure are not used.

2. Back-Pack Applicators

This applicator is used where weed infested areas are small, close to water sources or consist of trees or shrubs.

Advantages:

Adjustable droplet size by changing nozzle tip
Adjustable pressure
Large volume of carrier
Can be more plant specific if careful
Better regulation of application is possible

Disadvantages:
Labor intensive
Greater weight
Small area of treatment per tank load

3. Herbies

This equipment is used where weed infested areas are small, scattered or in rough terrain.

Advantages:
Small volume covers large area
Light weight
Use less chemical

Disadvantages:
- High drift potential
- Hard to identify where herbicide has been applied
- High possibility to hit nontarget species

4. Wipe Application (Usually consists of a hand tool used to wipe herbicide concentration onto the individual plants.)

This equipment is used where weed infested areas are small in size or close to water sources, trees or shrubs. The herbicide is a higher concentration than used in the normal liquid application equipment.

Advantages:
- Minimizes drift problem
- Restrict application to target species
- Light weight
- Use less herbicide

Disadvantages:
- High probability of missing target plant

  Some weed species such as leafy spurge eject herbicide such as Picloram through the roots into the root zone soil of trees and shrubs (this applies to all liquid applications)

5. Rope-Wick Applicator

   This type equipment is used in terrain where use of motorized ground equipment is feasible and very few trees and shrubs exist.

   Advantages:
   - Small volume covers large areas
   - Height of treatment is adjustable
   - Use less herbicide
   - Motor powered

   Disadvantages:
   - Cannot use in rough terrain
   - Cannot use in trees or shrub area

6. Roller Applicator

   Same uses, advantages and disadvantages as Rope-Wick Applicator.

7. Aerial Application

   Fixed-wing or helicopter options. Used in larger weed infestations where it is safe for use of low flying aircraft.

Advantages:
- Less labor intensive
- Generally less costly
- Greater coverage in less time
- Can treat hard-to-reach areas
- Application rate is consistent

Disadvantages:
- Highest risk of drift
- Highest risk of damage to nontarget plants
- Cannot use close to water
- Not applicable for spot treatment of small infestations.

Advantages of helicopter use over fixed wing:
- No special landing strip needed
- Trees, steep terrain less troublesome
- Greater accuracy

Advantages of fixed wing use over helicopter:
- Faster
- Lower Cost/Acre
- Greater Lifting Power in thin air
- Greater payload
- Cheaper on large projects
- More available

B. Granular Herbicide Applicators

1. Hand Cyclone Spreaders:

Generally for small infestations or hard-to-reach areas.

Advantages:
- No drift
- Ease of handling
- Accurately treat small infestations
- Easy to adjust

Disadvantages:

Hard to obtain accurate rate of application due to variance of ground speed of applicator.

Need greater buffer zone between water and treated area due to runoff potential.

Labor intensive
Units require frequent maintenance

2. Slip-in Granular Applicator

Generally used in larger infestations that can be reached with motorized vehicles.

Advantages:

- Limited drift
- Treat larger areas faster than with hand applicator
- Adjustable rate of application

Disadvantages:

- Need greater buffer zone between water and treated area due to runoff potential

3. Aerial Granular Applicators

Used in large infestations where it is safe to fly at low altitudes, fixed wing or helicopter.

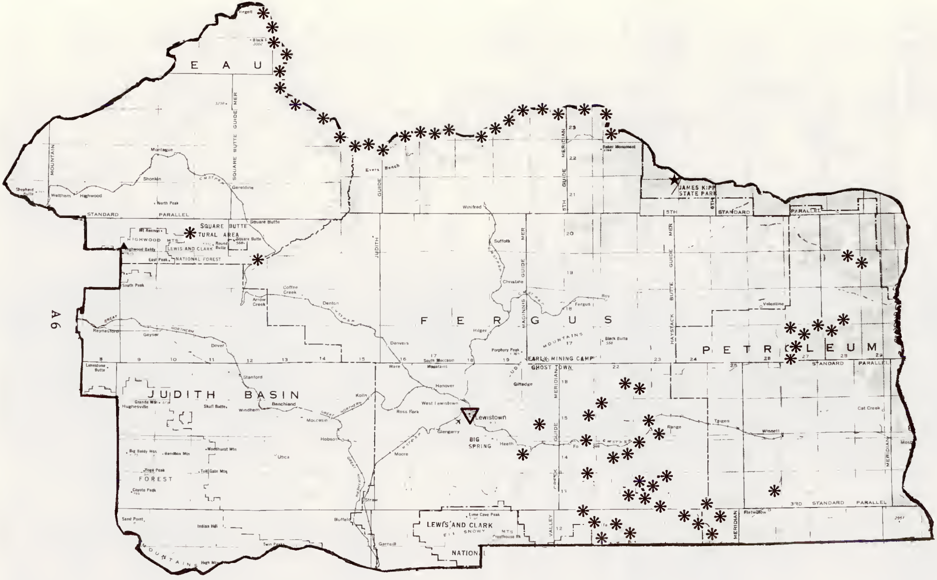
Advantages:

- Less labor intensive
- Generally less costly
- Greater coverage in less time
- Less chance of drift than aerial application of liquid
- Application rate is consistent

Disadvantages:

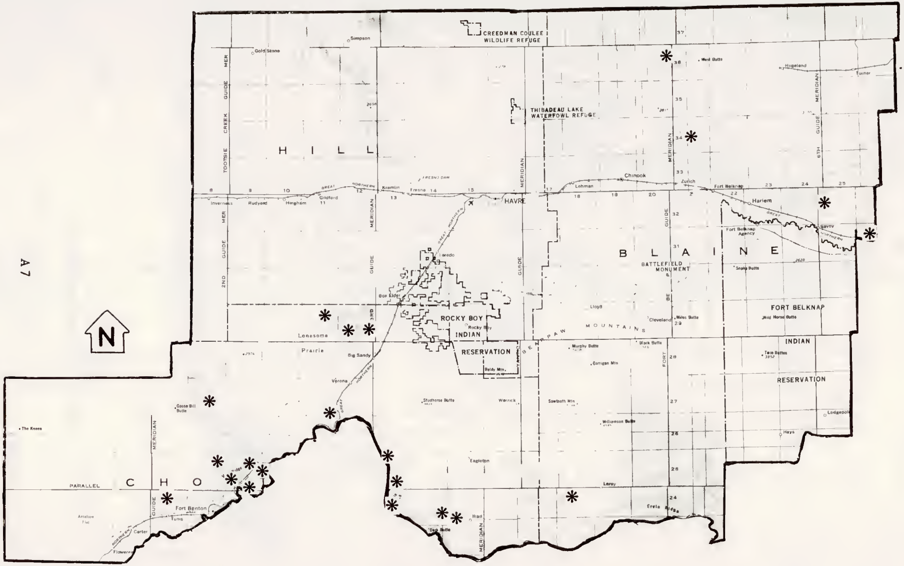
- Cannot use close to water
- Cannot spot treat small infestations

Appendix 2.2 — Weed infestation areas identified on Public lands — JUDITH RESOURCE AREA — MAP A



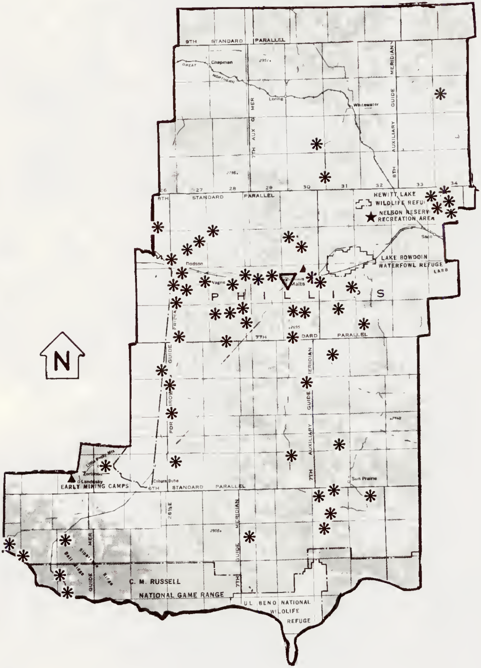
✱ — General Weed Infestation Area

Appendix 2.2 — HAVRE RESOURCE AREA — MAP B



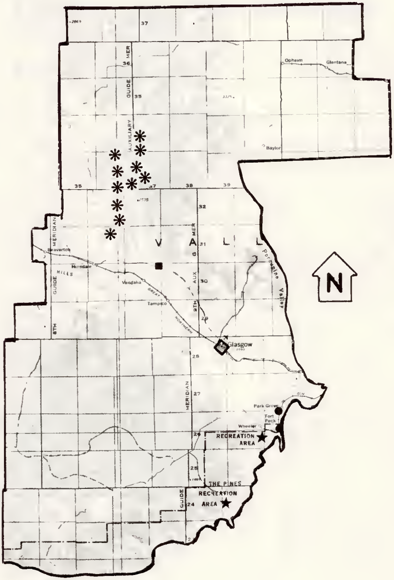
✱ — General Weed Infestation Area

Appendix 2.2 — PHILLIPS RESOURCE AREA — MAP C



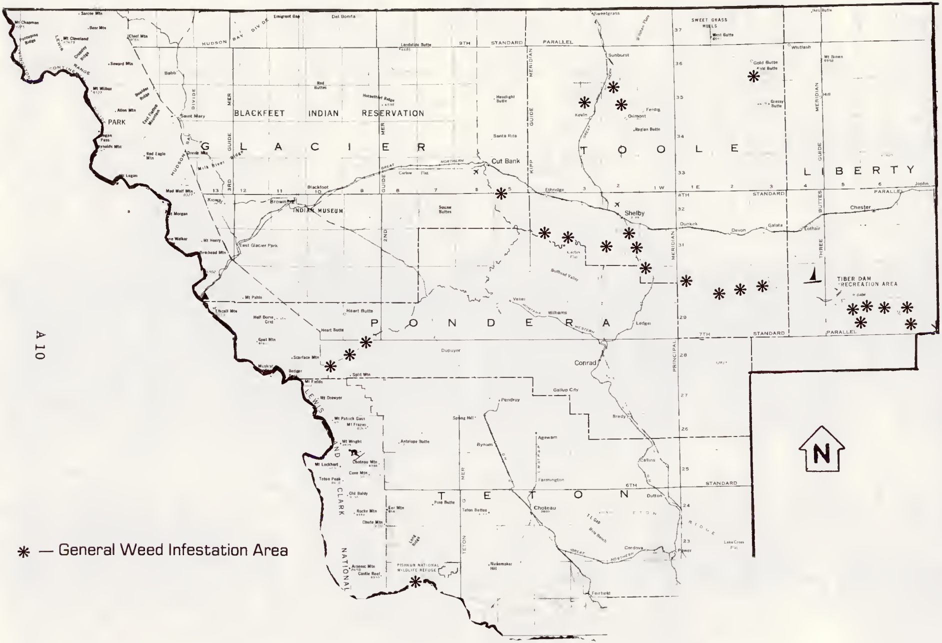
* — General Weed Infestation Area

Appendix 2.2 — VALLEY RESOURCE AREA — MAP D



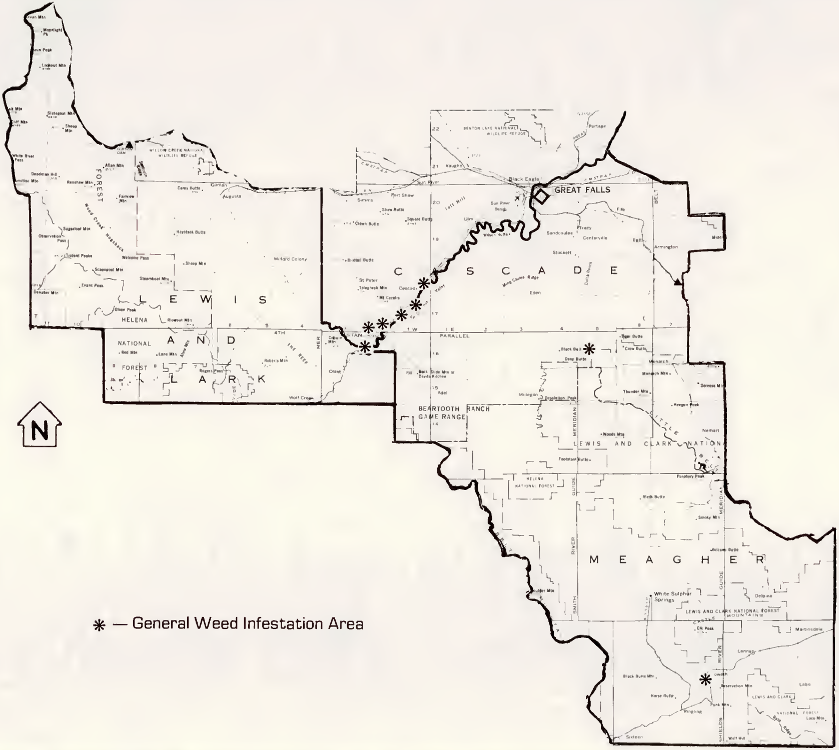
✱ — General Weed Infestation Area

Appendix 2.2 — GREAT FALLS RESOURCE AREA — North Half — MAP E



* — General Weed Infestation Area

Appendix 2.2 — GREAT FALLS RESOURCE AREA — South Half — MAP E (Cont.)



✱ — General Weed Infestation Area

Appendix 3.1: Principal Native Plants in the Lewistown BLM District

GRASS & GRASSLIKE

Alkali bluegrass
Alkali cordgrass
Alkaligrass
Alkali sacaton
American sloughgrass
Basin wildrye
Bearded wheatgrass
Big bluestem
Bluebunch wheatgrass
Blue grama
Bluegrass species
Bluejoint reedgrass
Bottlebrush squirreltail
Brookgrass
Canby bluegrass
Canadian wildrye
Columbia needlegrass
Cordgrasses
Cusick bluegrass
Green needlegrass
Idaho fescue
Indian ricegrass
Inland saltgrass
Little bluestem
Mannagrasses
Mat muhly
Montana wheatgrass
Mountain brome
Nebraska sedge
Neeldleandthread
Needleleaf sedge
Nuttall alkaligrass
Plains muhly
Plains reedgrass
Prairie cordgrass
Prairie junegrass
Prairie sandreed
Red threeawn
Reed canarygrass
Richardson's needlegrass
Rough fescue
Sandberg bluegrass
Sand bluestem
Sand dropseed
Sideoats grama
Slender wheatgrass
Sun sedge

GRASS & GRASSLIKE (Cont.)

Switchgrass
Tall reedgrasses
Tall sedges and rushes
Thickspike wheatgrass
Threadleaf sedge
Tufted hairgrass
Western wheatgrass

FORBS

American licorice
American vetch
Arrowleaf balsamroot
Aster sp.
Astragalus sp.
Bedstraw
Biscuitroot
Bitterroot
Black sampson
Bogorchid
Bracted spiderwort
Buckwheats
Buttercups
Cinquefoil sp.
Clover
Common dandelion
Dotted gayfeather
Eriogonum sp.
Fringed sagewort
Gaillardia sp.
Goldenpeas
Goldenrods
Green sagewort
Hairy goldenaster
Harebell
Hood's phlox
Horsemint
Knotweeds
Larkspur
Lomatium
Lupine
Mariposa lily
Milkvetches
Mountain dandelion
Penstemon
Phlox
Poverty sumpweed
Prairieclovers
Prairieconeflower
Prairie onion
Prairiesmoke
Prairie thermopsis

FORBS (Cont.)

Pricklypear cactus
Pussytoes
Ranunculus sp.
RockyMountain iris
Rush skeletonweed
Sageworts
Scarlet globemallow
Scurfpeas
Sticky geranium
Stiff sunflower
Thermopsis sp.
Water parsnip
Western yarrow
Wild onion

SHRUBS

Big sagebrush
Bittergrush
Black sagebrush
Broom snakeweed
Buffaloberry
Chokecherry
Creeping juniper
Currant sp.
Dogwood
Greasweood
Longleaf sagebrush
Mountain mahogany
Nuttall Saltbush
Rabbitbrush
Rose sp.
Serviceberry
Shadscale
Shrubby cinquefoil
Silver sagebrush
Skunkbush sumac
Snowberry sp.
Threetip sagebrush
Western snowberry
Winterfat
Yucca

TREES

Aspen
Birch
Boxelder
Commun juniper
Douglas-fir
Engelmman spruce
Green ash

Appendix 3.1: Principal Native Plants in the Lewistown BLM District (Cont.)

TREES (Cont.)

Limber pine
Lodgepole pine
Plains cottonwood
Ponderosa pine
Rocky Mountain juniper
Subalpine fir
Willows - cottonwood

APPENDIX 3.2: WILDLIFE SPECIES LIST

MAMMALS

Common Name	Scientific Name
Masked Shrew	*Sorex cinereus*
x Merriam Shrew	*Sorex merriami*
x Preble Shrew	*Sorex preblei*
Vagrant Shrew	*Sorex vagrans*
x Long-legged Myotis	*Myotis volans*
Little Brown Myotis	*Myotis lucifugus*
Little Long-eared Bat	*Myotis evotis*
Small-footed Myotis	*Myotis leibii*
Big Brown Bat	*Eptesicus fuscus*
Hoary Bat	*Lasiurus cinereus*
x Big-eared Bat	*Plecotus townsendii*
Silver-Haired Bat	*Lasionycteris noctivagar*
Raccoon	*Procyon lotor*
Short-tailed Weasel	*Mustela erminea*
Long-tailed Weasel	*Mustela frenata*
Least Weasel	*Mustela rixosa*
Mink	*Mustela vison*
* Black-footed Ferret	*Mustela nigripes*
Wolverine	*Gulo luscus*
Stripped Skunk	*Mephitis mephitis*
Badger	*Taxidea Taxus*
River Otter	*Lutra canadensis*
Red Fox	*Vulpes fulva*
Coyote	*Canis latrans*
* Gray Wolf	*Canis lupus*
Cougar	*Felis concolor*
x Canada Lynx	*Lynx canadensis*
Bobcat	*Lynx rufus*
Richardson Ground Squirrel	*Spermophilus richardsonii*
Thirteen-line Ground Squirrel	*Spermophilus tridecemlineatus*
Black-tailed Prairie Dog	*Cynomys ludovicianus*
Least Chipmunk	*Eutamias minimus*
Northern Pocket Gopher	*Thomomys talpoides*
Wyoming Pocket Mouse	*Perognathus fasciatus*
Ord Kangaroo Rat	*Dipodomys ordi*
Beaver	*Castor canadensis*
Northern Grasshopper Mouse	*Onychomys leucogaster*
Western Harvest Mouse	*Reithrodontomys megalotis*
Deer Mouse	*Peromyscus maniculatus*
White-footed Mouse	*Peromyscus leucopus*
Bushy-tailed Woodrat	*Neotoma cinerea*
Meadow Vole	*Microtus pennsylvanicus*
Prairie Vole	*Microtus ochrogaster*
Sagebrush Vole	*Lagurus curtatus*
Muskrat	*Ondatra zibethica*
Montane Vole	*Microtus montanus*
House Mouse	*Mus musculus*
Norway Rat	*Rattus norvegicus*
Western Jumping Mouse	*Zapus princeps*
Whitetail Jackrabbit	*Lepus townsendi*
Mountain Cottontail	*Sylvilagus nuttalli*
Desert Cottontail	*Sylvilagus auduboni*
Porcupine	*Erethizon dorsatum*
Rocky Mountain Elk	*Cervus canadensis*
Mule Deer	*Odocoileus hemionus*
White-tailed Deer	*Odocoileus virginianus*
Pronghorn Antelope	*Antilocapra americana*
Grizzly Bear	Ursus arctos horribilis
Rocky Mountain Bighorn Sheep	Ovis canadensis

AMPHIBIANS

Common Name	Scientific Name
Plains Spadefoot	*Scaphiopus bombifrons*
Great Plains Toad	*Bufo cognatus*
Dakota Toad	*Bufo hemiopheys*
Rocky Mountain Toad	*Bufo woodhousei*
Boreal Chorus Frog	*Psendacris triseriata*
Leopard Frog	*Rana pipiens*
Tiger Salamander	*Ambystoma tigrinum*

REPTILES

Common Name	Scientific Name
Prairie Rattlesnake	*Crotalus viridis*
Bull Snake	*Pituophis catenifer*
*Plains Hognose Snake	*Heterodon nasicus*
Racer	*Coluber constrictor*
Western Garter Snake	*Thamnophis elegans*
Plains Garter Snake	*Thamnophis radix*
Common Garter Snake	*Thamnophis sirtalis*
Painted Turtle	*Chrysemys picta*
*Western Spiny Softshell	*Trionyx spiniferus*
Short-horned Lizard	*Phrynosoma douglassi*
Sagebrush Lizard	*Sceloporus graciosus*
*Milk Snake	*Lampropeltis doliata*
*Common Snapping Turtle	*Chelydra serpentina*

* Endangered

x Species of special concern to Montana Department of Fish, Wildlife and Parks, 1979.

o Introduced species

BIRDS

Common Name	Scientific Name
Common Loon	*Gavia immer*
Red-Necked Grebe	*Podiceps grisegena*
Horned Grebe	*Podiceps auritus*
Eared Grebe	*Podiceps nigricollis*
Western Grebe	*Aechmophus occidentalis*
Pied-Billed Grebe	*Podilymbus podiceps*
White Pelican	*Pelecanus erythrorhynchos*
Double-Crested Cormorant	*Phalacrocorax auritus*
Great Blue Heron	*Ardea herodias*
Snowy Egret	*Egretta thula*
Black-Crowned Night Heron	*Nycticorax nycticorax*
American Bittern	*Botaurus lentiginosus*
White-Faced Ibis	*Plegadis chihi*
Whistling Swan	*Olor columbianus*
Canada Goose	*Branta canadensis*
White-Fronted Goose	*Anser albifrons*
Snow Goose	*Chen caerulescens*
Ross' Goose	*Chen rossii*
Mallard	*Anas platyrhynchos*
Black Duck	*Anas rubripes*
Gadwall	*Anas strepera*
Pintail	*Anus acuta*
Green-Winged Teal	*Anas crecca*
Blue-Winged Teal	*Anas discors*
Cinnamon Teal	*Anas cyanoptera*
American Wigeon	*Anas americana*
Northern Shovelor	*Anas clypeata*
Wood duck	*Aix sponsa*
Redhead	*Aythya americana*
Ring-necked Duck	*Aythya collaris*
Canvasback	*Aythya valisineria*
Lesser scaup	*Aythya affinis*
Common Goldeneye	*Bucephala clangula*
Barrow's Goldeneye	*Bucephala islandica*
Bufflehead	*Bucephala albeola*
White-winged Scoter	*Melanitta deglandi*
Ruddy Duck	*Oxyura jamaicensis*
Hooded Merganser	*Lophodytes cucullatus*
Common Merganser	*Mergus merganser*
Red-Breasted Merganser	*Mergus serrator*
× Goshawk	*Accipiter gentilis*
Sharp-Shinned Hawk	*Accipiter striatus*
× Cooper's Hawk	*Accipiter cooperii*
Red-Tailed Hawk	*Buteo jamaicensis*
Broad-Winged Hawk	*Buteo platypterus*
× Swainson's Hawk	*Buteo swainsoni*
Rough-Legged Hawk	*Buteo lagopus*
× Ferruginous Hawk	*Buteo regalis*
× Golden Eagle	*Aquila chrysaetos*
× Bald Eagle	*Hallaeetus leucocephalus*
Marsh Hawk	*Cirus cyaneus*
Prairie Falcon	*Falco mexicanus*
× Peregrine Falcon	*Falco peregrinus*
Gyr Falcon	*Falco rusticolus*
× Osprey	*Pandion haliaetus*
American Kestrel	*Falco sparverius*
× Merlin	*Falco columbarius*
Sharp-Tailed Grouse	*Pedioecetes phasianellus*
Sage Grouse	*Centrocercus urophasianus*
Ring-Nicked Pheasant	*Phasianus colchicus*
Blue Grouse	*Dendragapus obscurus*
Ruffed Grouse	*Bonasa umbellus*
Turkey	*Meleagris gallopauo*
Gray Partridge	*Perdix perdix*
Sandhill Crane	*Grus canadensis*
* Whooping Crane	*Grus americana*
Virginia Rail	*Rallus limicola*
Sora	*Porzana carolina*
American Coot	*Fulica americana*
× Mountain Plover	*Charadrius montanus*
Semipalmated Plover	*Charadrius semipalmatus*
Piping Plover	*Charadrius melodus*
Killdeer	*Charadrius vociferus*
American Golden Plover	*Pluvialis dominica*
Black-Bellied Plover	*Pluvialis squatarola*
Ruddy Turnstone	*Arenaria interpres*
Common Snipe	*Capella gallinago*
× Long-Billed Curlew	*Numenius americanus*
Upland Sandpiper	*Bartramia longicauda*
Solitary Sandpiper	*Tringa solitaria*
Spotted Sandpiper	*Actitis macularia*
Willett	*Catoptrophorus semipalmatus*
Greater Yellowlegs	*Tringa melanoleucas*
Lesser Yellowlegs	*Tringa flavipes*
Pectoral Sandpiper	*Calidris melanotos*
White-Rumped Sandpiper	*Calidris fuscicollis*
Baird's Sandpiper	*Calidris bairdii*
Least Sandpiper	*Calidris minutilla*
Western Sandpiper	*Calidris mauri*
Short-Billed Dowitcher	*Limnodromus griseus*
Long-Billed Dowitcher	*Limnodromus scolopaceus*
Stilt Sandpiper	*Micropalama himantopus*
Semipalmated Sandpiper	*Calidris pusilla*
Marbled Godwit	*Limosa fedoa*
Sanderling	*Calidris alba*
American Avocet	*Recurvirostra americana*
Black-Necked Stilt	*Himantopus mexicanus*
Red Phalarope	*Phalaropus fulicarius*
Wilson's Phalarope	*Steganopus tricolor*
Northern Phalarope	*Lobipes lobatus*
Herring Gull	*Larus argentatus*
California Gull	*Larus californicus*
Ring-Billed Gull	*Larus delawarensis*
Franklin's Gull	*Larus pipixcan*
Bonaparte's Gull	*Larus philadelphia*
Forster's Tern	*Sterna forsteri*
Common Tern	*Sterna hirundo*
Black Tern	*Chlidonias niger*
Mourning Dove	*Zenaidura macroura*
Rock Dove	*Columba livia*
Yellow-Billed Cuckoo	*Coccyzus americanus*
Black-Billed Cuckoo	*Coccyzus erthropthalmus*

BIRDS continued

Common Name	Scientific Name
House Wren	*Troglodytes aedon*
Long-Billed Marsh Wren	*Cistothorus palustris*
Short-Billed Marsh Wren	*Cistothorus platensis*
Rock Wren	*Salpinctes obsoletus*
Mockingbird	*Mimus polyglottus*
Gray Catbird	*Dumetella carolinensis*
Brown Thrasher	*Taxostoma rufum*
Sage Thrasher	*Oreoscoptes montanus*
American Robin	*Turdus migratorius*
Varied Thrush	*Ixoreus naevius*
Wood Thrush	*Hylocichla mustelina*
Hermit Thrush	*Catharus guttata*
Swainson's Thrush	*Catharus ustulata*
Gray-Cheeked Thrush	*Catharus minimus*
Veery	*Catharus fuscescens*
× Eastern Bluebird	*Sialia sialis*
× Mountain Bluebird	*Sialia currucoides*
× Western Bluebird	*Sialia mexicana*
Townsend's Solitaire	*Myadestes townsendi*
Blue-Grey Gnatcatcher	*Polioptila caerulea*
Golden-Crowned Kinglet	*Regulus satrapa*
Ruby-Crowned Kinglet	*Regulus calendula*
Water Pipit	*Motacilla spinoletta*
Sprague's Pipit	*Anthus spragueii*
Bohemian Waxwing	*Bombycilla garrulus*

Common Name	Scientific Name
Green-Tailed Towhee	*Pipilo chlorurus*
Lark Bunting	*Calamospiza melanocorys*
Savannah Sparrow	*Passerculus sandwichensis*
Baird's Sparrow	*Ammodramus bairdii*
Le Conte's Sparrow	*Ammospiza leconteii*
Sharp-Tailed Sparrow	*Ammospiza caudacuta*
Vesper Sparrow	*Pooecetes gramineus*
Lark Sparrow	*Chondestes grammacus*
Dark-Eyed Junco	*Junco hyemalis*
Gray-Headed Junco	*Junco caniceps*
Tree Sparrow	*Spizella arborea*
Chipping Sparrow	*Spizella passerina*
× Clay-Colored Sparrow	*Spizella pallida*
× Brewer's Sparrow	*Spizella breweri*
× Field Sparrow	*Spizella pusilla*
Harris' Sparrow	*Zonotriehia querula*
White-Crowned Sparrow	*Zonotrichia leucophrys*
White-Throated Sparrow	*Zonotrichia albicollis*
Fox Sparrow	*Passerella iliaca*
Lincoln's Sparrow	*Melospiza lincolnii*
Swamp Sparrow	*Melospiza georgiana*
Song Sparrow	*Melospiza melodia*
McCown's Longspur	*Calcarius mccownii*
Lapland Longspur	*Calcarius lapponicus*
Chestnut-Collared Longspur	*Calcarius ornatus*
Snow Bunting	*Plectrophenax nivalis*

FISH

Common Name	Scientific Name
Paddlefish	*Polyodon spathula*
Goldeye	*Hiodon alosoides*
Lake Whitefish	*Coregonus clupeaformis*
° Rainbow Trout	*Salvelinus gairdner*
° Brook Trout	*Salvelinus fontinalis*
Northern Pike	*Esox lucius*
° Carp	*Cyprinus carpio*
Golden Shiner	*Notemigonus crysoleucas*
Pearl Dace	*Semotilus margarita*
Northern Redbelly Dace	*Phoxinum eos*
Finescale Dace	*Phoxinus neogaeus*
Flathead Chub	*Hybopsis gracilis*
Lake Chub	*Couesius plumbeus*
Emerald Shiner	*Notropis atherinoides*
Brassy Minnow	*Hybognathus hankinsoni*
Silvery Minnow	*Hybognathus nuchalis*
Flathead Minnow	*Pimephales promelas*
Longnose Dace	*Rhinichthys cataractae*
River Carpsucker	*Carpoides carpio*
Smallmouth Baffalo	*Ictiobus bubalus*
Bigmouth Buffalo	*Ictiobus cyprinellus*
Shorthead Redhorse	*Moxostoma macrolepidotum*
Longnose Sucker	*Catostomus catostomus*
White Sucker	*Catostomus commersoni*
° Black Bullhead	*Ictalurus melas*

Common Name	Scientific Name
Channel Catfish	*Ictalurus punctatus*
Stone Cat	*Noturus flavus*
Burbot (Ling)	*Lota lota*
Brook Stickleback	*Culaea inconstans*
° Pumpkinseed	*Lepomis gibbosus*
° Bluegill	*Lepomis mackochirus*
° Largemouth Bass	*Micropterus salmoides*
° White Crappie	*Pomoxis annularis*
° Black Crappie	*Pomoxis nigromaculatus*
° Yellow Perch	*Perca flavescens*
Sauger	*Stizostedion canadense*
° Walleye	*Stizostedion vitreum*
Iowa Darter	*Etheostoma exile*
Mottled Sculpin	*Cottus bairdi*
° Smallmouth Bass	*Micropterus dolomieui*
Mountain Whitefish	*Prosopium williamsoni*
Freshwater Drum	*Aplodinotus grunniens*
Shovelnose Sturgeon	*Scaphirhynchus platorynchus*
° Brown Trout	*Salmo trutta*
° Goldfish	*Carassius auratus*
Plains Minnow	*Hybognathus placitus*
Blue Sucker	*Cycleptus elongatus*
Mountain Sucker	*Catostomus platyrhynchus*
° Mosquitofish	*Gambusia affinis*
° White Bass	*Roccus chrysops*
American Smelt	*Osmerus Mordax*

° Introduced species.

BIRDS continued

Common Name	Scientific Name
Barn Owl	*Tyro alba*
Screech Owl	*Otus asio*
Great Horned Owl	*Bubo virginianus*
Snowy Owl	*Nyctea scandiaca*
x Burrowing Owl	*Athene cunicularia*
Long-Eared Owl	*Asio otus*
Short-Eared Owl	*Asio flammeus*
x Saw-Whet Owl	*Aegolius acadicus*
Poor-Will	*Phalaenoptilus nuttallii*
Common Nighthawk	*Chordeiles minor*
White-Throated Swift	*Aeronautes saxatilis*
Chimney Swift	*Chaetura pelagica*
Ruby-Throated Hummingbird	*Archilochus colubris*
Belted Kingfisher	*Mergaceryle alcyon*
Common Flicker	*Colaptes auritus*
Red-Headed Woodpecker	*Melanerpes erythrocephalus*
Lewis Woodpecker	*Melanerpes lewis*
Yellow-Bellied Sapsucker	*Sphyrapicus varius*
Hairy Woodpecker	*Picoides villosus*
Downy Woodpecker	*Picoides pubescens*
Eastern Kingbird	*Tyrannus tyrannus*
Western Kingbird	*Tyrannus verticalis*
Scissor-tailed Flycatcher	*Muscivora forficata*
Say's Phoebe	*Sayornis saya*
Alder Flycatcher	*Empidonax alnorum*
Cedar Waxwing	*Bombycilla cedrorum*
Northern Shrike	*Lanius excubitor*
Loggerhead Shrike	*Lanius ludovicianus*
Starling	*Sturnus vulgaris*
Solitary Vireo	*Vireo solitarius*
Red-Eyed Vireo	*Vireo olivaceus*
Warbling Vireo	*Vireo gilvus*
Black & White Warbler	*Mniotilta varia*
Tenessee Warbler	*Vermivora peregrina*
Orange-Crowned Warbler	*Vermivora celata*
Yellow Warbler	*Dendroica petechia*
Yellow-Rumped Warbler	*Dendroica coronata*
Blackpoll Warbler	*Dendroica striata*
Palm Warbler	*Dencroica pinus*
Ovenbird	*Seiurus aurocapillus*
Northern Waterthrush	*Seiurus noveboracensis*
Mourning Warbler	*Oporornis philadelphia*
McGillivray's Warbler	*Oporornis tolmiei*
Common Yellowthroat	*Geothlypis trichas*
Yellow-Breasted Chat	*Icteria virens*
Wilson's Warbler	*Wilsonia pusilla*
American Redstart	*Setophaga ruticilla*
House Sparrow	*Passer domesticus*
x Bobolink	*Dolichonyx oryzivorus*
Western Meadowlark	*Sturnella neglecta*
Yellow-Headed Blackbird	*Xanthocephalus xanthocephalus*
Blackthroated Green Warbler	*Dendroica virens*

Common Name	Scientific Name
Red-Winged Blackbird	*Agelaius phoeniceus*
Orchard Oriole	*Icterus spurius*
Northern Oriole	*Icterus galbula*
Rusty Blackbird	*Euphaga carolinus*
Brewer's Blackbird	*Euphaga cyanocephalus*
Common Grackle	*Quiscalus quiscula*
Brown-Headed Cowbird	*Molothrus ater*
Western Tanager	*Piranga lucoviciana*
Rose-Breasted Grosbeak	*Pheucticus ludovicianus*
Black-Headed Grosbeak	*Pheucticus melanocephalus*
Blue Grosbeak	*Guiraca caerulea*
Evening Grosbeak	*Hesperiphona vespertina*
Pine Grosbeak	*Pinicola enucleator*
Indigo Bunting	*Passerina cyanea*
x Dickcissil	*Spiza americana*
Lazuli Bunting	*Passerina amoena*
Purple Finch	*Carpodacus purpureus*
Gray-Crowned Rosy Finch	*Leucosticte tephrocotis*
Black Rosy Finch	*Leucosticte atrata*
Hoary Redpoll	*Carduelis hornemanni*
Common Redpoll	*Carduelis flammea*
Pine Siskin	*Carduelis pinus*
American Goldfinch	*Carduelis tristis*
Red Crossbill	*Loxia curvirostra*
Rufous-Sided Towhee	*Pipilo erythrophthalmus*
Willow Flycatcher	*Empidonax trailli*
Least Flycatcher	*Empidonax minimus*
Dusky Flycatcher	*Empidonax oberholseri*
Western Flycatcher	*Empidonax difficilis*
Western Wood Pewee	*Contopus sordidulus*
Horned Lark	*Eremophila alpestris*
Violet-Green Swallow	*Tachycineta thalassina*
Tree Swallow	*Iridoprocne bicolor*
Bank Swallow	*Riparia riparia*
Rough-Winged Swallow	*Stelgidopteryx ruficollis*
Barn Swallow	*Hirundo rustica*
Cliff Swallow	*Petrochelidon pyrrhonota*
Purple Martin	*Progne subis*
Blue Jay	*Cyanocitta cristata*
Pinyon Jay	*Gymnorhinus cyanocephalus*
Gray Jay	*Perisoreus canadensis*
Black-Billed Magpie	*Pica pica*
Clark's Nutcracker	*Nucifraga columbiana*
Common Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Black-Capped Chickadee	*Parus atricapillus*
Mountain Chickadee	*Parus gambeli*
Dipper	*Cinclus mexicanus*
White-Breasted Nuthatch	*Sitta carolinensis*
Red-Breasted Nuthatch	*Sitta canadensis*
Brown Creeper	*Certhia familiaris*

Appendix 4.1: Control of Noxious Plants

A. Control of Noxious Plants in Wooded Uplands, Wooded Floodplains, and Riparian Habitats

These critical areas require very careful analysis to determine the type and intensity of noxious plant control efforts. No attempt is made to prepare "cook-book control scenarios" for these areas. Site specific evaluations are required. The following factors must be carefully considered in each plant control site evaluation.

1. The types and density of vegetation associated with the noxious plants.
2. The proximity of noxious plants to all surface water including streams, lakes, reservoirs, irrigation facilities, wells, and springs.
3. Leaching possibilities of pesticides change as soil texture changes. The texture of soil can be placed into three broad groups for pesticide recommendations.
    a. Coarse textured soils include: sand, loamy sand or sandy loam.
    b. Medium textured soils include: loam, silt loam, silt, sandy clay loam and sandy clay.
    c. Fine textured soils include: silty clay loam, clay loam, silty clay and clay.
4. The depth to subsurface water (when related to coarse textured soil), soil organic matter content (affects chemical stability in soil), susceptibility to flooding and frequency (affects kind and timing of application), and average annual precipitation (effects movement and leaching of chemical). Percent rock fragment in the soil may also modify treatment rates.
5. The availability of other noxious plant control methods like biological (insects or grazing animals), fire, and mechanical (mowing, pulling, etc.) in conjunction with chemical control.
6. The economic importance of adjacent areas to the community.
7. Point-source or origin of the noxious plant infestation. If the infestation source is not controlled (such as upstream areas along perennial streams), it is highly unlikely that isolated control downstream will have much impact on the problem in the long term. This reiterates the critical need for coordinated control efforts that target point-source areas.

8. Fish and Wildlife - The previous seven factors directly and indirectly address aquatic environments. The final criterion addresses all fish and wildlife resources. The full digest of evaluation factors are presented in Section II - Description of Alternatives, Part B, Alternatives Considered, pages 12 through 34.

B. Training and Certification of BLM Employees For Pesticides Application

Montana Department of Agriculture personnel developed an EPA approved training and certification program for people working with herbicides. All personnel responsible for supervision of handling, storing, applying or disposing of herbicides in the BLM must be properly trained and licensed in the appropriate application categories. Because the programs are quite general in nature, the BLM has developed an EPA approved supplemental training and certification program that is scheduled for BLM employees every two or three years.

C. Chemical Pest Control Per BLM Manual 9222

District and Area Managers will assure that the herbicide specialist and all individuals responsible for direct supervision of noxious plant control work will be trained and certified through the Montana Department of Agriculture and/or BLM program and licensed by the state. These certified individuals must assure that all individuals for which they are responsible that are involved in planning, reviewing, and applying the herbicides are properly trained and knowledgeable. Because of frequent modifications in the herbicide labeling, application techniques and equipment availability, BLM personnel involved in noxious plant control efforts are encouraged and permitted to attend supplemental training courses. Attendance at these courses will permit the employee to remain in the pesticide field and accumulate credits toward recertification. When state recertification is required, retraining and reexamination will be scheduled for the BLM employees.

Appendix 4.2: Economic Methodology

USING SAGERAM (Rangeland Investment Analysis Computer Program) FOR WEED CONTROL PROJECTS

A. Existing Situation (Data entry on Rangeland Investment Analysis - SageRam Table 1)

The existing situation should show the expected loss in livestock forage productivity due to noxious weed infestations. Loss in forage productivity will increase over time depending on the rate of spread and the current location of infestations. For investment analysis purposes the following rates of spread are assumed:

1.	Knapweeds	15%/yr.
2.	Leafy Spurge	12%/yr.
3.	Other weeds	4%/yr.

Table A shows acres of rangeland infested and the loss in forage productivity for selected weed species and years assuming an initial infestation of one acre. This table is set up with a base level and four additional levels similar in format to the SageRam Table 1. Table A can be used to estimate the loss in livestock forage productivity over time for the existing situation. For example, if 15 acres are currently infested with diffuse knapweed the loss in forage productivity would be 6 AUMs in the 10th year (first level: .40 x 15 = 6.0), 25 AUMs in the 20th year (second level: 1.64 x 15 = 24.6) and so forth (see Table A). These AUMs can then be deducted from the base level to show the decrease over time in livestock forage. Since weeds will undoubtedly infest adjacent allotments and other lands (state and private) the loss

Table A. Acres of rangeland infested and loss in forage productivity for selected weed species and years assuming an initial infestation of one acre 1/.

		Base Level	First Level 10 Yrs.	Second Level 20 Yrs.	Third Level 30 Yrs.	Fourth Level 40 Yrs.
Knapweeds	Acres Infested	1	4.00	16.40	66.20	267.90
	Loss in AUMs 2/	.10	.40	1.64	6.62	26.79
Leafy Spurge	Acres Infested	1	3.10	9.60	30.00	93.10
	Loss in AUMs 2/	.10	.31	.96	3.00	9.31
Other Weeds 3/	Acres Infested	1	1.50	2.20	3.20	4.80
	Loss in AUMs 2/	.10	.15	.22	.32	.48

1/ Assumed rates of spread are 15%/yr. for knapweeds, 12%/yr. for leafy spurge and 4%/yr. for other weeds.

2/ Assumes 6.3 acres/AUM with a 63% reduction in forage.

3/ Includes dalmation toadflax and whitepoint loco weed.

in forage productivity from those lands should be included in the investment analysis. Loss in forage on adjacent allotments and other lands can be included under the other outputs section of the SageRam table. The loss in forage can be calculated using Table A but must be converted to dollars using $9.23/AUM.

Dollar entries under the other outputs section (Table 1) should be entered as negative values indicating the loss of forage. For example, if 15 acres are infested with diffuse knapweed, the acres of rangeland infested and loss in forage productivity in the 40th year will be 4,019 acres (fourth level: 267.90 x 15) and 402 AUMs (fourth level: 26.79 x 15), see Table A. If the allotment with the 15 acres of current infestation contains 1,260 acres and 200 AUMs, then when all 1,260 acres are infested there would be a loss of 126 AUMs annually (assumes a 63% reduction in forage). The remaining 276 AUMs must be accounted for in the other outputs section as $2,547 (276 x $9.23/AUM) under the fourth level, year 40.

B. Proposed Investment Program (Data entry on Rangeland Investment Analysis - SageRam Table 2)

The proposed program should show the existing AUM level for livestock and normally no change for the analysis period (50 years). A change would be appropriate only if additional AUMs would be allocated to livestock. If the other outputs section was used in Table 1, entries will be required in the Table 2 base level. Since loss of forage on adjacent lands would not be expected with eradication or containment, zeros would be entered in the other outputs section.

Costs of weed control are estimated at $50/acre for chemicals, labor, equipment and BLM supervision. Costs for the EA clearance sheet, pesticide use proposal, pesticide application record, etc. can be included under management costs, initial BLM workdays (page 1 of SageRam Table 2). Only include management costs for the proposed weed control project.

C. Weed Control Project Example (see attached SageRam computer run) Assume the following situation:

1. allotment with 700 acres and 100 AUMs,
2. 10 acres infested with diffuse knapweed,
3. 5 acres infested with leafy spurge,
4. herbicide application on 10 acres of knapweed the first year and follow-up work on 5 acres each year for the next 4 years,
5. herbicide application on 5 acres of leafy spurge the first year with follow-up work on 5 acres each year thereafter,
6. herbicide application costs of $50/acre and initial management costs of 3 BLM workdays.

Table B shows the increase in diffuse knapweed and leafy spurge infestations for this example.

Table B. Increase in diffuse knapweed and leafy spurge infestations.

		Diffuse Knapweed		Leafy Spurge		Total		Loss of AUMs within Allotment		Loss of AUMs on other lands & value 1/	
Level	Yr.	Acres Infested	Loss of AUMs	Acres Infested	Loss of AUMs	Acres Infested	Loss of AUMs	Acres	AUMs	AUMs	($)
First	10	40	4	16	2	56	6	56	6	0	0
Second	20	164	16	48	5	212	21	212	21	0	0
Third	30	662	66	150	15	812	81	700	70	11	102
Fourth	40	2,679	268	466	47	3,145	315	700	70	245	$2,261

1/ AUMs valued at $9.23/AUM.

Since the allotment contains only 700 acres with 100 AUMs the loss of forage on other lands will need to be accounted for in the other outputs section on SageRam Table 1. No entries are needed for the first and second levels but 11 AUMs must be accounted for in the third level and 245 AUMs in the fourth level. These AUMs are valued at $102 and $2,261 respectively.

SageRam Tables 1 and 2 include the above information and assumptions. From the investment analysis the present value of the benefits (loss of forage productivity avoided) and costs are $2,836 and $4,642 respectively. This indicates a benefit/cost ratio of 0.6:1 with an internal rate of return of 5.9%. It should be emphasized that the analysis does not include all net economic benefits to society since SageRam will not account for the continual loss in forage productivity over time. However, the program does provide a relative ranking for comparison with other weed control projects and range improvements. The SageRam program will provide a consistent and conservative estimate of the benefits of weed control projects.

[illegible] Existing Program Data

	St.	District	Resource Area	Allotment Name	Allot No.	Prog. Ident.	Base Year
0,1	MT	LL ISTOWN	LEWISTOWN	WEED-CON ROL-PROJECT	0000	LLES	1983

Data Prepared By:

	Range Cons. Last Name	Wildlife Biologist Last Name	Other Preparer Last Name	Title	Other Preparer Last Name	Title
0,2						

Structural Projects

		Unit	Number	Total Ann. Maint. Cost	Total Ann. Maint. %BLM
0,3	Springs	No.			
0,4	Reservoirs	No.			
0,5	Wells	No.			
0,6	Pipelines	Mi.			
0,7	Fences	Mi.			
0,8	Cattleguards	No.			
0,9					
1,0					
1,1					

Nonstructural Projects

		Unit	Number of Units by Age Class 1-5	6-10	11-15	16-20	21-25	+25	Life Span	Total Replacement Cost	Total Replacement %BLM
1,2	Mech. Control	Ac.									
1,3	Chem. Control	Ac.									
1,4	Burning	Ac.									
1,5	Seeding (drill)	Ac.									
1,6											
1,7											
1,8											

Livestock Forage

		Units	Base Level	First Level Units	Yr.	Second Level Units	Yr.	Third Level Units	Yr.	Fourth Level Units	Yr.
1,9	Livestock	AUMs	100	94	10	79	20	30	30	30	40

Recreation Use

		Units									
2,0	Hunting Days Deer	HDs									
2,1	Elk	HDs									
2,2	Antelope	HDs									
2,3	Other Big Game	HDs									
2,4	Waterfowl	HDs									
2,5	Upland & Small Game	HDs									
2,6	Angler Days Warm Water	ADs									
2,7	Cold Water	ADs									
2,8	Rec. Days Devlpd. Site	RDs									
2,9	Dispersed Use	RDs									
3,0	Non-Game Wildlife	RDs									

Other Outputs

		Units									
3,1	Soil/Water Damage	$'s									
3,2	OTHER-LANDS	$'s	0	0	10	0	20	-102	30	-2261	40
3,3		$'s									
3,4		$'s									

3,5 ___ % of Livestock AUMs available between ___ and ___ of the Final Level.

Mo. Day Mo. Day

Program Data

	District	Resource Area	Allotment Name	Allot. No.	Prog. Ident.	Price Year
0,1	LEWIS	VN	LEWISTOWN WEED-CONTROL PROJECT	0000	LLPA	1983

Data Prepared By:

	Range Cons. Last Name	Wildlife Biologist Last Name	Other Preparer Last Name	Title	Other Preparer Last Name	Title
0,2						

Structural Projects

		Unit	New Units	Construction Cost by Year 1	2	3	4	5	%BLM	Years to First Maint.	Annual Maint. Cost	%BLM	Replacement Life	Replacement Cost
0,3	Springs	No.												
0,4	Reservoirs	No.												
0,5	Wells	No.												
0,6	Pipeline	Mi.												
0,7	Fences	Mi												
0,8	Cattleguards	No												
0,9														
1,0														
1,1														

Nonstructural Projects

		Unit	New Units	Construction Cost by Year 1	2	3	4	5	%BLM	Life Span	Replacement Cost	%BLM
1,2	Mech. Control	Ac.										
1,3	Chem. Control	Ac.										
1,4	Burning	Ac.										
1,5	Seeding (drill)	Ac.										
1,6	KNAPWEEDS	AC	10	500	250	250	250	250	100	50	0	100
1,7	SPURGE	AC	5	250	0	0	0	0	100	0	250	100
1,8												

Management Costs

		Initial	Annual
1,9	Cooperator Workdays:		
2,0	BLM Workdays:	3	

Allot. # ________

RANGELAND INVESTMENT ANALYSIS: Table 2 - Alternative Program Benefits

Livestock Forage

		Units	Base Level	First Level Units	Yr.	Second Level Units	Yr.	Third Level Units	Yr.	Fourth Level Units	Yr.
2,1	Livestock	AUMs	100	100	10	100	20	100	30	100	40

Recreation Use

		Units									
2,2	Hunting Days Deer	HDs									
2,3	Elk	HDs									
2,4	Antelope	HDs									
2,5	Other Big Game	HDs									
2,6	Waterfowl	HDs									
2,7	Upland & Small Game	HDs									
2,8	Angler Days Warm Water	ADs									
2,9	Cold Water	ADs									
3,0	Rec. Days Devlpd. Site	RDs									
3,1	Dispersed Use	RDs									
3,2	Non-Game Wildlife	RDs									

Other Outputs

		Units									
3,3	Soil/Water Damage	$'s									
3,4	OTHER-LANDS	$'s	0	0	10	0	20	0	30	0	40
3,5		$'s									
3,6		$'s									

3,7 ____ % of Livestock AUMs available between ____ (Mo. Day) and ____ (Mo. Day) of the Final Level.